THE BOOK OF KNOWLEDGE

The
BOOK *of* KNOWLEDGE

The Children's Encyclopedia

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DEPARTMENTS

The Earth
Stories and Legends
All Countries
Golden Deeds
Helps to Learning
Literature
Animal Life
Famous Books
Dominion of Canada
The United States
Familiar Things
Our Own Life
The Fine Arts
Men and Women
Poetry and Rhymes
Plant Life
Things to Make
and Things to Do
Book of Wonder

VOLUME V

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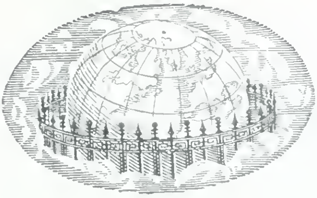

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This is a short guide to the principal contents of this volume. It is not possible to give all of the questions in The Book of Wonder, or the titles of all of the Little Verses and Problems, but in all cases the pages are given where such sections of the book begin. In the big Index, Volume 20, you will find every title and every subject, including the pictures.

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The State, War and Navy Department Building.

WASHINGTON, OUR CAPITAL CITY

THE honored name of our capital city turns our thoughts to the past, to the days when the nation just at its beginning was fortunate in having such a leader as George Washington, the first president, to think and plan what should be done. Like other truly great leaders, he knew how to choose the men who could meet the needs of the time in different posts, and serve not only their own generation but the future.

When the Congress of the young country decided to build an entirely new city for a capital, there was at hand a French engineer who had come with Lafayette in 1777 to fight in the Revolutionary army and had afterward shown himself to be a skillful and gifted architect. When he heard of the project for a new capital he began to dream out a city of rare beauty, and he wrote to President Washington for a commission. As soon as permission was received the architect, Major Pierre Charles L'Enfant, eagerly gave his mind to surveying and planning. His design was on such generous lines that people laughed at the broad open stretch, a mile long, between Capitol and White House; but his vision saw far into the future. What he saw we are now realizing.

In 1825 L'Enfant died poor and disheartened because of difficulties and enmities that he could not conquer; but the city of his dream is still being expanded in accordance with the faded old plan which he left and which was brought to light again about 1900, when new efforts were being made to beautify Washington. L'Enfant's plan was found to be the best.

Let us suppose that we have just reached Washington for our first visit. Emerging from the fine Union Railway Station, we can already see the Capitol building as we stand in the plaza before the station. In a taxicab we drive through the tree-lined streets toward its great dome, which seems to hang high up against the sky.

We leave our taxi at the eastern front and climb the broad flight of steps that leads to the rotunda of the Capitol. On each side of us is a colossal group of marble figures. One is Persico's Columbus and an Indian girl, and the other represents a pioneer in desperate conflict with a savage. Before us are the beautiful bronze doors designed by Randolph Rogers, representing a series of scenes in the life of Christopher Columbus from his first voyage in search of the New World to his sad death at Valladolid, in 1506.

Through these massive doors we enter the rotunda, or interior of the dome. The Capitol possesses some interesting statuary and paintings, and as we pass through its halls, we may see them.

As we come into the great circular hall of the rotunda, we pause for a moment at the door to note the magnificent columned corridors spread out before us. The walls are decorated with a bewildering array of paintings, sculptures and frescoes. Over us the vaulted canopy of the dome is aglow with color. As we stand breathlessly gazing about us and wondering where we shall begin our inspection of the pictures, a guide who has been viewing us from the distance hastens forward and takes us under his wing.

The canopy, he explains, is an allegorical fresco, painted by Burnside, representing Washington surrounded by all the Arts, Sciences and Industries.

There are some paintings upon the rotunda walls that are worth noting—The Landing of Columbus, The Discovery of the Mississippi, The Baptism of Pocahontas, The Embarkation of the Pilgrims, and a series of impressive pictures by Trumbull showing scenes in the American Revolution. We wander along admiring these and the fresco by Brumidi and Castigini that encircles the wall. We mount into the whispering gallery just below the canopy, and as we stand there we can distinctly hear the murmured words of a party on the opposite side of the gallery.

SOME INARTISTIC STATUES OF SOME GREAT MEN

We visit the National Statuary Hall, one of the most beautiful rooms in the Capitol. It was once the Hall of the House of Representatives, before the new wing was built. It is semicircular in shape and adorned with noble columns. The domed ceiling, decorated after the design of the Roman Pantheon, rises fifty-seven feet to the cupola that lights the room. Around the room on their marble bases stand statues of men who have been famous in the history of the country. Each state has the right to select two persons who have been prominent in its history. Many of the statues are very badly done, and reflect more credit upon American patriotism than upon American art. Among these statues is one that arrests our attention—the figure of a woman—Frances Elizabeth Willard, the first woman to be given a place in Statuary Hall. The most interesting figure in the hall is the statue of Père Marquette, and there is in another place a fine head of President Lincoln, a copy of which is in the College of the City of New York.

As we turn and look at the door through which we have just entered Statuary Hall from the rotunda, we pause to glance at the great clock above the door. Behind the clock is a winged car resting on a globe circled by the Zodiac. This car is meant to represent Time, the guide tells us. In the car is the marble figure of a woman called History. The clock was designed by Franzoni, a sculptor popular many years ago.

We take a peep into the Supreme Court Room, once the Senate Chamber; and see the Hall of Representatives and the Senate Chamber, impressive in their simplicity. As we pass through the corridor our attention is arrested and held by a picture on the wall of the landing of the West Stairway. It is called Westward Ho, and has for its legend Bishop Berkeley's words, "Westward the Star of Empire takes its way." The picture represents an emigrant caravan stopping to rest in one of the defiles of the Rocky Mountains. The scene holds all the wild grandeur of the rough mountain pass, yet beyond is a glimpse in the distance—the Land of Promise—a land wonderfully fair to see.

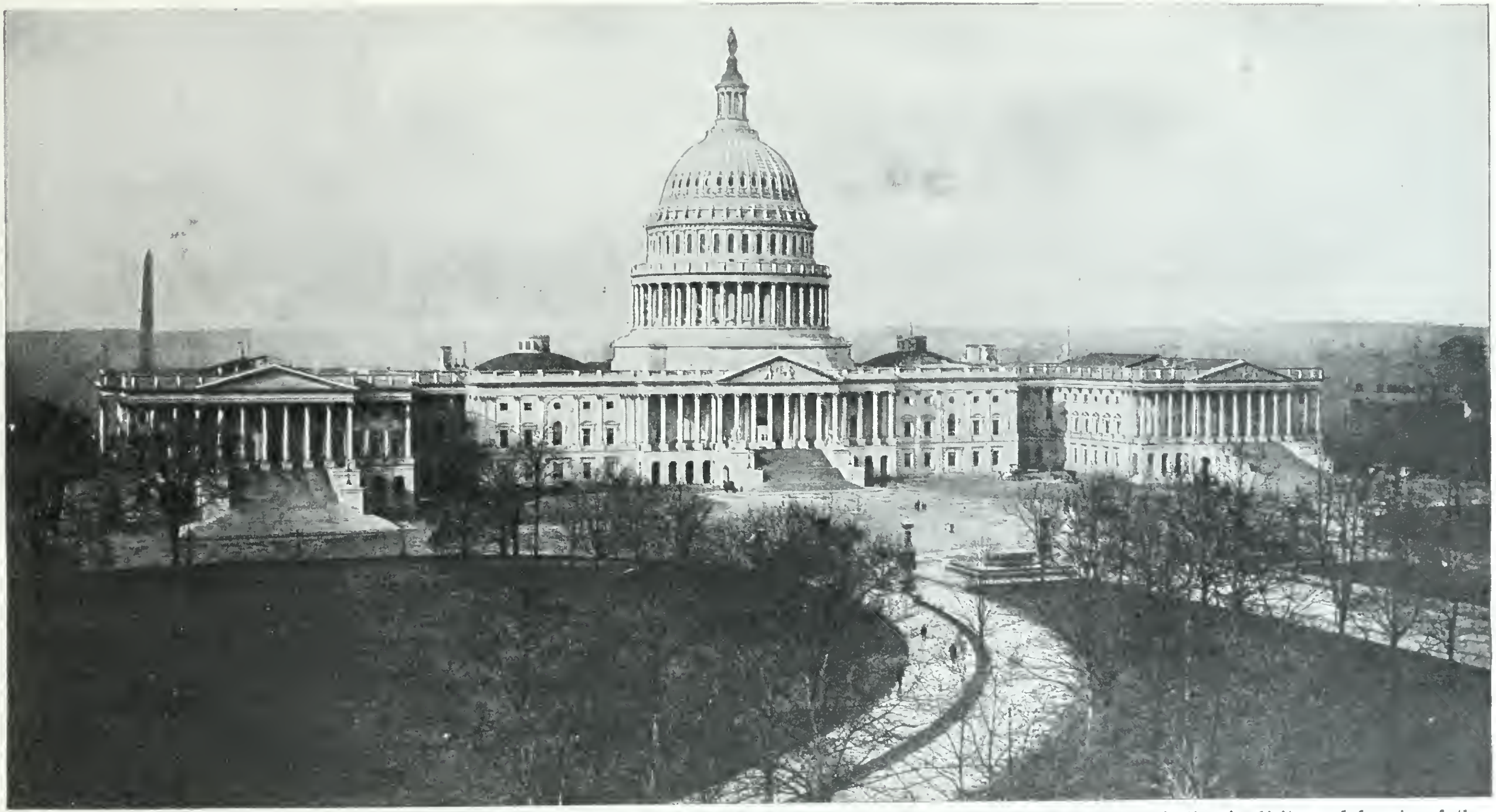
We visit the President's Room, with its quiet richness of decoration; we see the Senators' Reception Room, known as the Marble Room because it is constructed wholly of that material, with stately Corinthian columns of Italian marble, paneled walls of Tennessee marble and a wonderful ceiling of marble from Vermont. We inspect the Public Reception Room, a richly furnished apartment glowing with brilliant colors and having a vaulted ceiling with allegorical frescoes depicting War, Peace, Liberty, Plenty, Power, Temperance, Prudence and Justice.

THE MOST BEAUTIFUL LIBRARY IN THE WORLD

We leave the Capitol and walk a little way through its beautiful grounds to the Library of Congress—an impressive marble building, three stories high, surrounded by gardens with broad stretches of greensward and trees.

We enter the Central Stair Hall, a

WHERE THE NATION DOES ITS BUSINESS



Here is a picture of the East Front of the Capitol at Washington seen over the tree-tops of the Capitol grounds. Note the majestic simplicity and beauty of the building, and the great white dome against the background of the sky. It is probably the most stately of all legislative palaces. The Capitol is a building of which there is no cause to be ashamed. The Senate wing to the right and the House wing to the left were constructed after the central portion. People generally see the other side first, as the city has grown toward the West instead of the East, as had been expected, and most of the hotels are in that direction.

magnificent structure of polished marble. On each side of us rise lofty rounded columns with elaborate capitals of Corinthian design. The lofty arches rise above, exquisitely decorated with marble rosettes, palm leaves and foliated designs of wonderful delicacy. We climb the low, broad stairway slowly, pausing now and then to admire one or another of the carved figures in its alcoves. In the entrance pavilion above we see the wonderful series of paintings by H. O. Walker depicting Lyric Poetry and the Poets' Boys—Emerson's Uriel; Wordsworth's The Boy of Winander; Milton's Comus; Shakespeare's Adonis; Keats's Endymion; Tennyson's Ganymede.

In the South Curtain Corridor are The Greek Heroes, painted by Walter McEwen. These are nine pictures having for their themes the Greek myths of Paris, Jason, Bellerophon, Orpheus, Perseus, Prometheus, Theseus, Achilles and Hercules. In the Representatives' Reading Room we find two beautiful mantels showing Law—a woman radiant-faced, enthroned, with Fraud, Discord and Violence on her left, and Truth, Peace and Industry on her right—and History, with Tradition and Mythology, one on either side.

The results of good and bad administration are shown in a series of paintings we see in the Reading Room Lobby, while the Evolution of the Book is beautifully pictured in six panels, painted by John W. Alexander. The Family, Religion, Labor, Study, Recreation and Rest, painted by Charles Sprague Pearce, decorate the North Hall. The ones called The Family and Religion are singularly beautiful. The latter shows two worshipers, a man and a woman, kneeling before a rude stone altar from which ascends the smoke of their sacrifice, and before the rude altar, and clustering close about it, are some wild growing flowers of the iris plant.

And so we wander on, now inspecting the panels, now some dancing figures of the Muses, now the Graces, now the Sciences and Arts. Two visions of The Seasons are seen in the panels by F. W. Benson and the sculpture reliefs by Bela L. Pratt. Which is the more beautiful of these we hardly know. Both win us by the simplicity and flowing beauty of their lines.

Two lunettes, one of War and the other of Peace, appear on the walls of the Northwest Gallery of the third floor. War represents a procession returning from battle with two hounds straining at their leash; then foot soldiers with spears and bucklers; then the king on his white horse riding over the fallen bodies of the slain; the color-bearer; and last of all the wounded borne on litters carried by their companions. In Peace, we see a troop of worshipers bearing a votive offering, the effigy of a goddess in the centre and a boy leading an ox bringing up the rear.

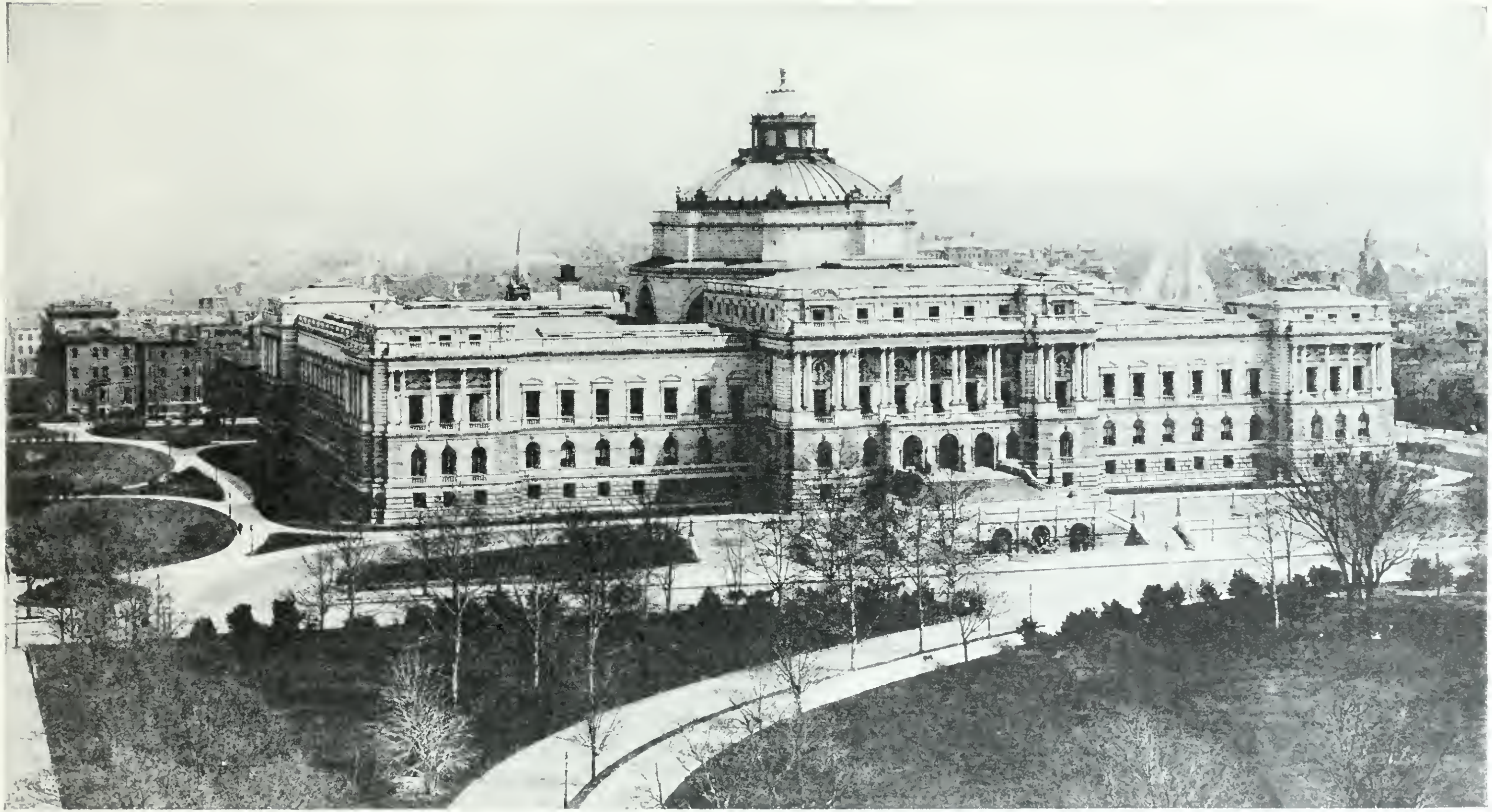
WASHINGTON, THE "CITY OF MAGNIFICENT DISTANCES"

We leave the Library, and, driving around the Capitol grounds, come out on Pennsylvania Avenue. We are going to the White House. We lean forward in our seats that we may get a better view of the streets through which we are passing. Washington was once called in mockery the "City of Magnificent Distances," and such it truly seems to us as we bowl slowly along the mile of the avenue which is so broad that there is no feeling of being crowded. The street cars in the middle seem to take up scarcely any room. Up the side streets we see trees, trees, trees, and where streets and avenues cross there are so many beautiful little spots of green. "On every side of us there is a picture"—a picture of unruffled tranquillity, of beauty and of prosperity—rare combinations in the national capital of a large country. We think of the changes that have taken place since President Washington first chose this spot upon the banks of the Potomac for the seat of government in 1790. Then it was an untrod wilderness, and as late as 1800, when the Capitol itself had been built, a belle of the times described it as a "town of streets without houses."

WASHINGTON AS IT WAS A HUNDRED YEARS AGO

Oliver Wolcott, in an interesting letter to his wife, says there was at that time "one good Tavern about forty yards from the Capitol, and several other houses and buildings, but I do not perceive how the members of Congress can possibly secure lodgings unless they will consent to live like scholars in a college or monks in a monastery, crowded ten or twenty in one house and utterly secluded from society. The only resource for such as wish to live comfortably will be found in Georgetown, three miles distant over as bad a road in

THE GREAT LIBRARY OF CONGRESS



The Library of Congress is one of the most impressive public buildings in the city of Washington. It stands on the edge of the Capitol grounds, and the long vista of the city streets beyond gives a very good idea of the way in which the avenues radiate from the Capitol like the spokes of a wheel. All the wonderful decoration, both of painting and sculpture, was done by American artists. The Library of Congress contains one of the largest collections of books and maps to be seen anywhere in the world. Authors or publishers must send the Librarian two copies of every book or periodical they wish to copyright, that is, to claim as their own property. Other books are bought with funds which are provided for this purpose by Congress.

winter as the clay grounds near Hartford."

Gouverneur Morris wrote humorously: "We want nothing here but houses, cellars, kitchens, well-informed men, amiable women and other trifles to make our city perfect. . . . In short it is the very best city in the world for future residence."

THE MODEST BUT IMPRESSIVE HOME OF THE PRESIDENTS

At last we reach and pass the Treasury Building and see set in a noble park the residence of the presidents, known to everyone as the White House. Washington himself selected the place for the White House, and laid the cornerstone in 1792, and lived to see the building completed, though he never occupied it. That honor was reserved for his successor, John Adams, and his wife Abigail, who occupied it in 1800. It was burned by British troops in 1814 during Madison's administration, which included the War of 1812. But it was soon rebuilt and, except for new coats of dazzling white paint, was little changed until 1902–3 and again in 1909, when additions were built on each side.

These new rooms are only one story high and hardly show above the terraced lawn, but they afford room for the President's offices and for entrances into the public rooms, up to that time in the main building.

Let us enter the public rooms, which are sometimes open during certain hours of the day. We make our way through a long colonnade on the east end which leads to the basement corridor, where hang the portraits of many of the mistresses of the mansion. Along the walls are cases in which are bits of historic china or ornaments used in bygone days. Ascending the broad stairway, we reach the centre hall, from which we may enter the great East Room, where the formal receptions are held. This magnificent room is bare of furnishing, but the proportions are so beautiful and the colors so harmonious that we do not realize it.

THE WHITE HOUSE AT WASHINGTON

Here is a picture of the White House, with one of the new wings built by President Roosevelt during his administration. It is interesting to know that Washington chose the site of the building and that John Adams was the first President to live in the Executive Mansion. It was burned by the British during the War of 1812, but was at once rebuilt. The walls of the building were blackened, but not destroyed.

The other rooms are not usually open to the public, but if we have special permission, the guide may take us into the Blue Room, with its hangings of blue silk and the clock sent to Lafayette by the great Napoleon and by him presented to

Washington. The Green Room has green velvet on the walls and contains portraits of many of the presidents, besides interesting things sent by foreign rulers. The glory of the Red Room is the portrait of Washington by Gilbert Stuart, the picture which was saved by Dolly Madison. In the State Dining Room the formal dinners are given, and a hundred guests may sit down at the massive mahogany table. The private rooms of the president's family are not shown.

We leave the White House, and after a delightful little luncheon in a restaurant on Pennsylvania Avenue, we drive back through the Presidential Park, bound for the Washington Monument. Sightseeing is rather tiresome, however enjoyable, and we gladly settle back among the cushions of our taxi to view comfortably the green, fresh beauty of the public grounds through which we are passing. "The trees! The wonderful quiet majesty and greenness of the trees!" we exclaim, with a little sigh of deep content.

THE WONDERFUL TREES OF WASHINGTON

On every side are the rolling lawns and great trees in a glory of summer greenery. A soft midday breeze stirs through the wide-spreading elms on one side and ruffles the leaves of sturdy oaks and sugar maples on another. "No such trees adorn a city anywhere else in America." Each avenue is planted with one variety only. The oaks that line one street are superb. The great horse-chestnuts that bloom on another offer an ever-growing enjoyment of vista of leaf and flower. The beauty of shrubs, the evergreens, the great magnolias of the South, the symmetrical lawn trees that are profusely used to adorn the circles and the small squares, fills us with a sense of peaceful satisfaction.

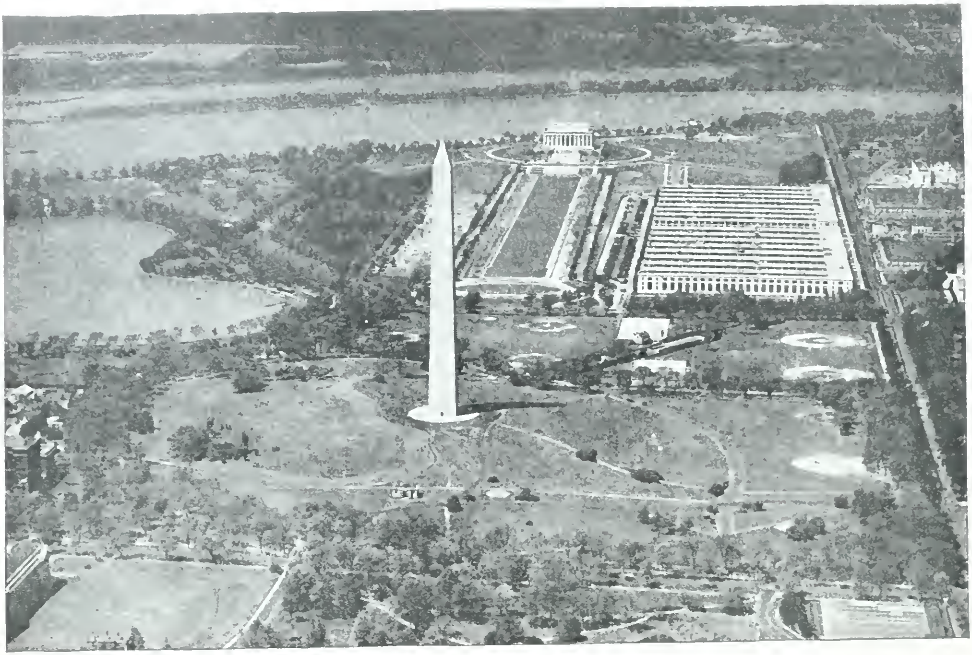
Since 1872 the city of Washington has been systematically planting and controlling the trees under governmental authority and it has spent hundreds of thousands of dollars on this good work.

Suddenly through the trees we catch our first real glimpse of the Washington Monument. How purely it raises its straight shaft into the air, a majestic tapering obelisk of white against the sky. We descend from our taxi and enter the monument. The interior is lighted by electricity. The elevator carries us nearly to the top, a height of 555 feet. As we

THE MONUMENT

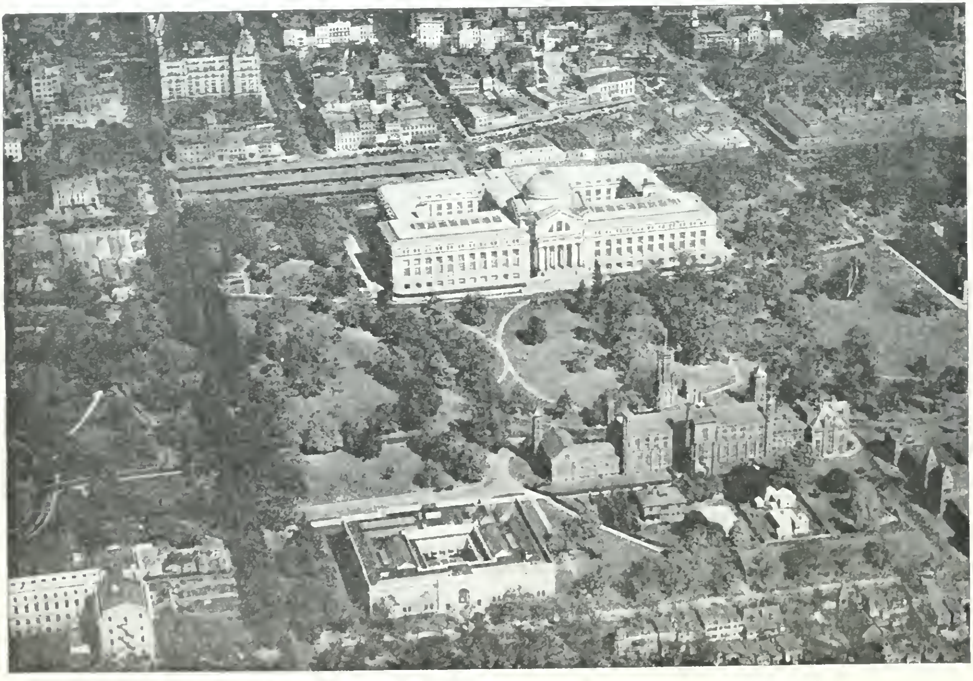
The Washington Monument was completed in 1885 in memory of George Washington, the Father of His Country and the first president of the United States. From the little windows in the sloping sides of the top of the monument a wonderful bird's-eye view of the city of Washington can be obtained.

TWO AIR VIEWS OF THE CAPITAL



Official photograph, U. S. Army Air Service Photographic Section.

The Washington Monument is the central object in this view of Potomac Park. Beyond it, with the long formal pool for approach, stands the Lincoln Memorial; still beyond flows the Potomac. Temporary buildings, which during the World War replaced trees and shrubbery, are at the right.



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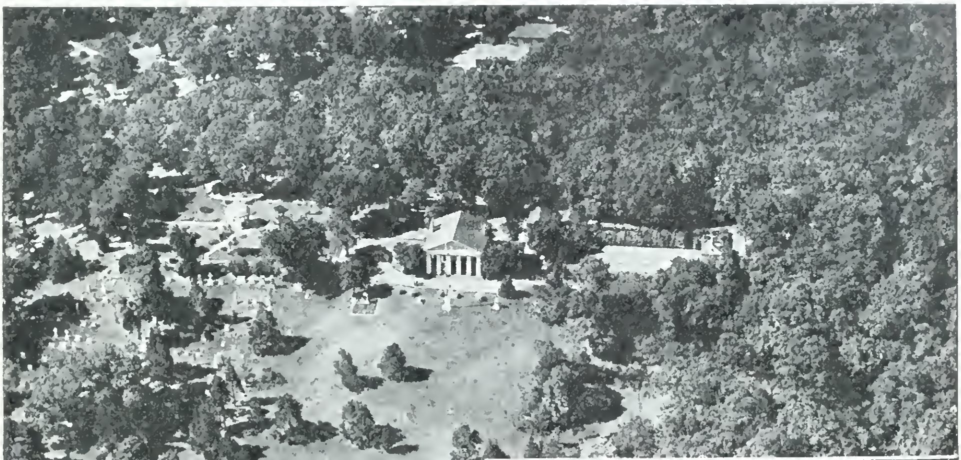
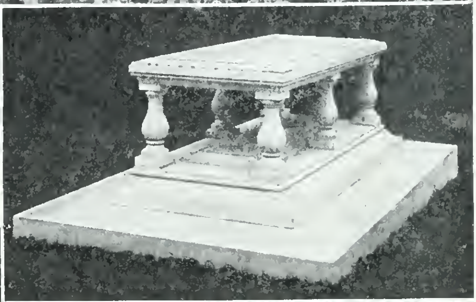
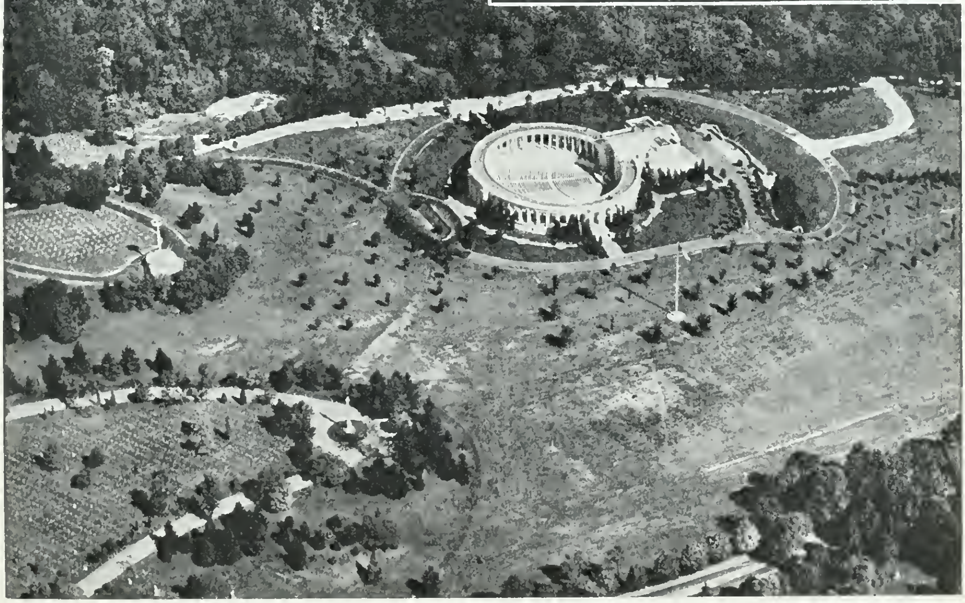
This second view of Potomac Park shows the new National Museum in the central background. In front and to the right is the old Smithsonian Institution; while the square building near the centre of the foreground houses laboratories of the Department of Agriculture, where scientific research is made.

IN ARLINGTON NATIONAL CEMETERY



Arlington, the Lee Mansion for which the cemetery is named—once the home of Washington's adopted son—forms the heart of this air view.





The grave of Major L'Enfant, designer of Washington (shown in the insert), is very near the Lee Mansion. The lower view gives an excellent impression of the great Memorial Amphitheatre, where is the grave of the Unknown Soldier. In the left background stands the mast of the U. S. S. Maine, guarding the graves of those who were lost when the battleship was blown up in 1898.

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slowly rise up the elevator shaft we catch glimpses through the cage of a series of stones—on the landings of the stairway—dedicated to the memory of Washington.

ONE OF THE MOST BEAUTIFUL MONUMENTS IN THE WORLD

There are 170 of these stones—many of them notable for their beautiful and elaborate carving. When we have reached the height of 504 feet we leave the elevator and step out on a platform. Here the walls are pierced with eight port openings, or windows, two on each side. Through these we get an extensive bird's-eye view of the city. On one side of us stretches the great parkway with the Treasury, the State, War and Navy Departments, and the White House; on another side, through the intervening treetops, we catch a glimpse of the Smithsonian Institution, the National Museum and the white gleaming dome of the Capitol; to the south, beyond the beautiful Lincoln Memorial, flow the waters of the Potomac between their green winding banks; while yonder to the west are the wooded slopes of peaceful Arlington, where lies the "Field of the Dead," containing the bodies of many who gave their lives for their country on the battlefield. The tomb of the Unknown Soldier is there. There, too, is the burial place of Major L'Enfant. For long years he lay in a humble grave, which friends had provided for him; but in 1909 he was carried with honor to be placed on a hillside here, overlooking his dream city. Let us pause for a moment to think of the two men to whom first of all we owe this capital beside the Potomac—Washington, who chose the site, and L'Enfant, who planned the arrangement.

From our high, far-seeing view of the great and singular city spread out at our feet, we realize for the first time how strikingly different Washington is from all other cities. Not only is it noted for its dignified public structures that house the government's business, for its extensive public parkways of the Mall, the Public Gardens, the Capitol Grounds and the President's Park, but it is not a city laid out in checker-board fashion as other cities are. The avenues radiate from the Capitol and the Executive Mansion, north and south and east and west, in straight broad lines like the spokes of a great wheel, and here and there, where they cross the streets, are dotted with circles or squares of little parks that break the monotony with spots of rich green.

In a line with the Capitol and the Washington Monument is the noble memorial to Abraham Lincoln. Approaching it, we admire its fine classical proportions; then, passing between the simple Doric and Ionic columns, we stand reverently before the seated marble figure of Lincoln—the work of the sculptor, Daniel Chester French. The Memorial building, designed by Henry Bacon, was completed in 1922.

Returning past the monument, we drive through the Agricultural Grounds, where is the building of the Agricultural Department, and crossing the street, we enter the grounds of the great Smithsonian Institution. Through the green screen of the trees we catch glimpses of the red sandstone building of the Institution itself, and of the National and New National Museums, and of the Medical Museum.

LAST MOMENTS IN WASHINGTON AND A VISIT TO MOUNT VERNON

We have only a short time left, and we decide to spend it all in the New National Museum. We enter the building from the park, and turn to the right to reach the great collection of animals made by President Roosevelt. Here are many of the animals of which we read in this book. There are bears and lions, antelopes and deer of all sorts, tall giraffes, striped zebras, monkeys of all kinds, and many beautiful birds. There is not time for any of the other interesting things in the museum.

We are leaving Washington, for we wish to see Mount Vernon, the home and burial-place of George Washington. On an eminence overlooking the Potomac River stands a simple home built of wood and two stories high. A high piazza runs along the whole front of the house, which has six rooms of moderate size on the ground floor, containing many objects of historical interest. The plain brick tomb, to which Washington's remains were removed from the old family vault in 1831, stands a few hundred yards from the house, near a wooded ravine. Mount Vernon, which needed repairs badly, was bought in 1858 by the Ladies' Mount Vernon Association, which holds it in trust for the people.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 1695.

ARCHITECTURE THAT CHARMS THE EYE

The Capitol on a rainy night. Flood lights play upon the dome. A light in the high circular gallery is a sign that Congress is in night session.

The apse of the Cathedral of St. Peter and St. Paul at Mount St. Alban. In it are the tombs of Woodrow Wilson and Admiral Dewey.

The grand staircase in the Library of Congress, a fine building of Renaissance style, completed in 1897. Notice the wealth of decoration.

View from the portico of the Memorial Continental Hall of the D. A. R. The thirteen fluted columns were given by the original thirteen states.

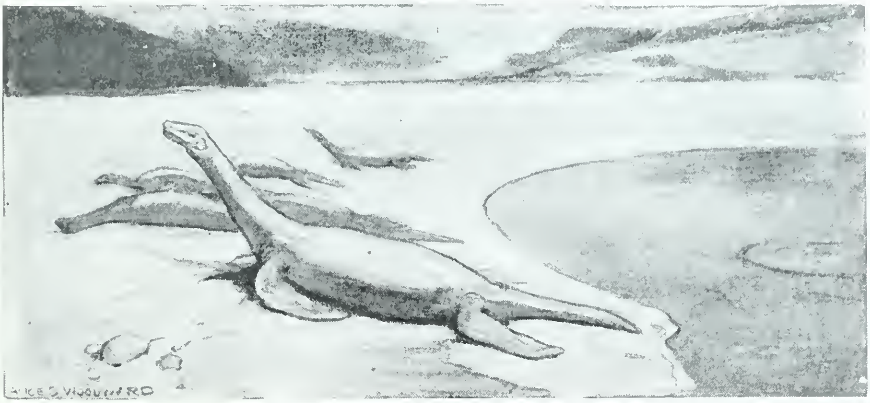
Pictures, from photographs by Ewing Galloway, Kadel & Herbert, and Wide World Photos.

WORLD-BEAUTY GATHERED TOGETHER

Seen through a bower of blossoming Japanese cherry trees in the spring, the exquisite Lincoln Memorial doubles its loveliness by reflection. Its fine Greek proportions can be better seen in a closer view, on the page with portraits of the presidents; and on page 1038 is a picture of the statue of Lincoln within it.

As the flowering trees of Japan and the pure outlines of the architecture of old Greece make for beauty in the upper picture, Latin America is represented in this building of the Pan-American Union. Within its court, or patio, is an Aztec fountain set amid the luxuriant foliage of South American plants. Here meet the conferences of the American nations.

© Horydczak.



The plesiosaurus of the Jurassic Period.

THE JURASSIC PERIOD

BETWEEN the Triassic and Jurassic periods there is no great gap. The plant life and the animal life are of the same general character in each, but in the Jurassic Period there are many more species of animals. The reptiles have increased so much in size and number that it may be called the Age of Reptiles. The first fossils of true birds also are found.

Jurassic rocks are found all over the world, and they cover a vast area in Europe. They are seen in the extreme north of Scotland, and can be traced from Yorkshire across England to Dorset, over the English Channel through France to the Jura Mountains—which give the period its name—to the Alps and Apennines, to Spain and northern Germany, and to central and eastern Russia. They are found also in Tibet, Kashmir, Nepal and in South America, South Africa, New Zealand and Australia.

In North America there are few Jurassic rocks. During the period most of the land was high above the water. In the East there are no rocks which we can be sure were formed during the period. In the West the land sank and we find Jurassic rocks.

Alaska was the first to disappear beneath the waters, and then Vancouver Island and much of California and Oregon. Later an inland sea, separated from the Pacific by high mountains, covered most of British Columbia and much of Alberta, and extended over Montana, Idaho, Nevada, Utah and Wyoming, and a part of Colorado. This has been named the Logan Sea. In Wyoming the rocks are 3,500 feet thick. The rocks of the Jurassic in America are sandstones, shales, limestones and marls.

During the greater part of the Jurassic Period most of England was slowly sinking; but toward the close of the period there was a great uplift of land. At one time almost the whole of England was under water, and vast stretches of land around it poured mud into the water, but before the end of the period most of the mud had risen into sight and had become clothed with vegetation.

The vegetation of the Jurassic Period was probably luxuriant, but not very varied in character. As in the Triassic Period ferns, horsetails, pines and cycads flourished. There were also maiden-hair trees resembling the maiden-hair tree which now grows in China and Japan.

The animal life of the period shows a very varied aspect, and is full of interest. Land and water forms of life abounded in both periods; many strange forms appeared. The ammonites, so numerous in the Triassic Period, began to die out, but the belemnites more than held their own. There is no lack of sponges among the fossils of this period, and starfishes and molluscs are plentiful. Particularly abundant are the corals, and during this period most of Europe seems to have been submerged under a sea full of coral islands and coral reefs. These coral reefs can be traced from Yorkshire to Dorset, and from Normandy to the Mediterranean. They are found, too, over the east of France along the Jura Mountains and part of the Alps. A very different Europe it must have been then, with coral reefs in Yorkshire and on the mountains.

THE COUNTRY GIRL WHO FOUND THE ICHTHYOSAURUS BY THE SEA

In this period there were plenty of insects, such as beetles, dragon-flies, grasshoppers, earwigs, crickets, walking-stick insects; and it was then that the first flies and ants made their appearance. Fishes, too, were numerous, and sharks and rays were well represented in the Triassic seas.

In the Triassic rocks the first mammals appeared, and in the English Jurassic rocks many mammals have been found, while from the Jurassic rocks of the United States has come a still more varied collection of mammal remains.

The most interesting animals of the time are undoubtedly the great lizards. One of the most amazing of these is the Ichthyosaurus, or fish-lizard, numbers of which have been found in the quarries of Lyme Regis. In these quarries the first one was found by a country girl, Mary Anning, who made a living by collecting and selling fossils. She was hammering away at the rock one day when she noticed some big bones sticking out. When she had cleared away the rubbish and rubble round about, she found the skeleton of a huge animal and hired workmen to dig out the whole block of stone. It proved to be a monster thirty feet long, with six-foot jaws and huge eyes like saucers.

THE GIANT FISH-LIZARD WITH THE BODY AND TAIL OF AN ANIMAL

The ichthyosaurus has been described as having "the muzzle of a porpoise, the head of a lizard, the jaws and teeth of a crocodile, the vertebræ of a fish, the breastbone of an ornithorhynchus, the paddles of a whale, and the trunk and tail of an ordinary quadruped." It breathed air, and had blowers with which it could blow out a column of water. It moved through the water by means of four paddles, each one made of about a hundred bones. Its eyes were large and were surrounded by a circle of small bones which could be used to vary their magnifying power.

The Plesiosaurus, also found first in the quarries of Lyme Regis, was another monstrous creature of the Jurassic Period. It had the head of a lizard, the teeth of a crocodile, and a neck resembling the body of a serpent, the sides of a chameleon, the fins of a whale, and a trunk and a tail. It was not so large as the ichthyosaurus, but specimens twenty-four feet long have been found.

Stranger in some ways, though not so monstrous, were the flying lizards, or Pterodactyls, which have been described as half vampire, half woodcock, with a crocodile's teeth along its tapering bill, and scale armor over its lizard-like body. The largest were about the size of a swan, and the smallest about the size of a snipe.

THE FIRST REAL BIRD MAKES ITS APPEARANCE IN THE WORLD

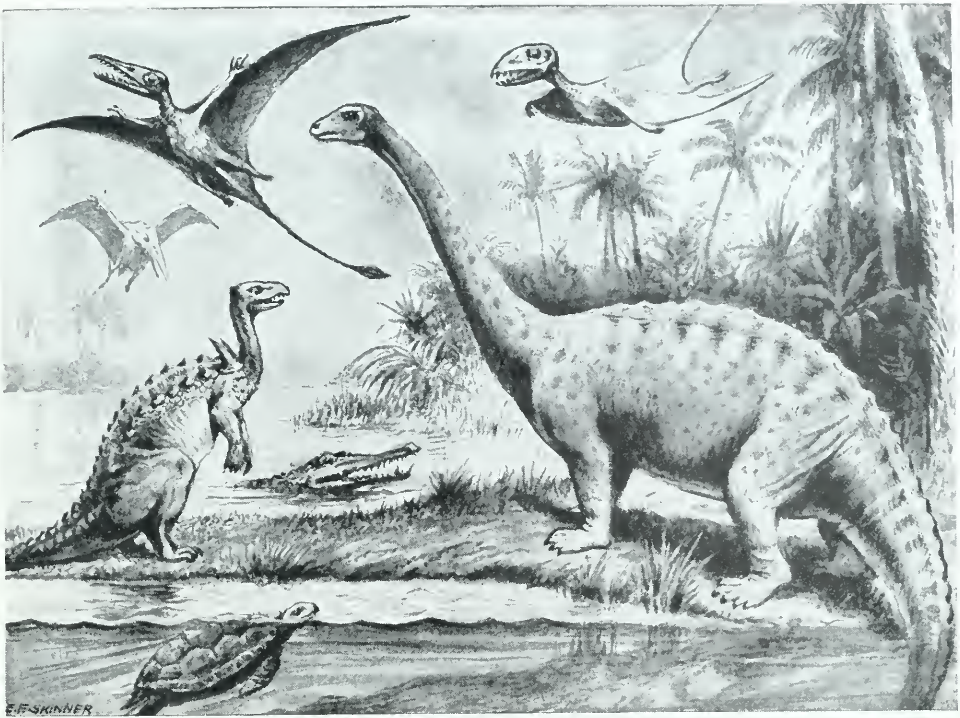
The pterodactyls were not really birds, but in the Jurassic rocks a true bird—the Archæopteryx—was finally discovered. It was rather smaller than a crow, had teeth in its jaws, and had a long feathered tail, and wings with three wing fingers.

Big as were the sea lizards, there were still larger reptiles on land. The dinosaurs which appeared in Triassic times now attained gigantic dimensions. The Brontosaurus was fifty feet long and probably weighed about twenty tons. Each footprint covered about a yard. The Diplodocus was still larger; and the Atlantosaurus, with a thigh bone eight feet long, is supposed to have been about one hundred feet long and thirty feet high. The Gigantosaurus must have dwarfed even the Atlantosaurus, for one of its thigh bones measuring eleven feet has been discovered in America.

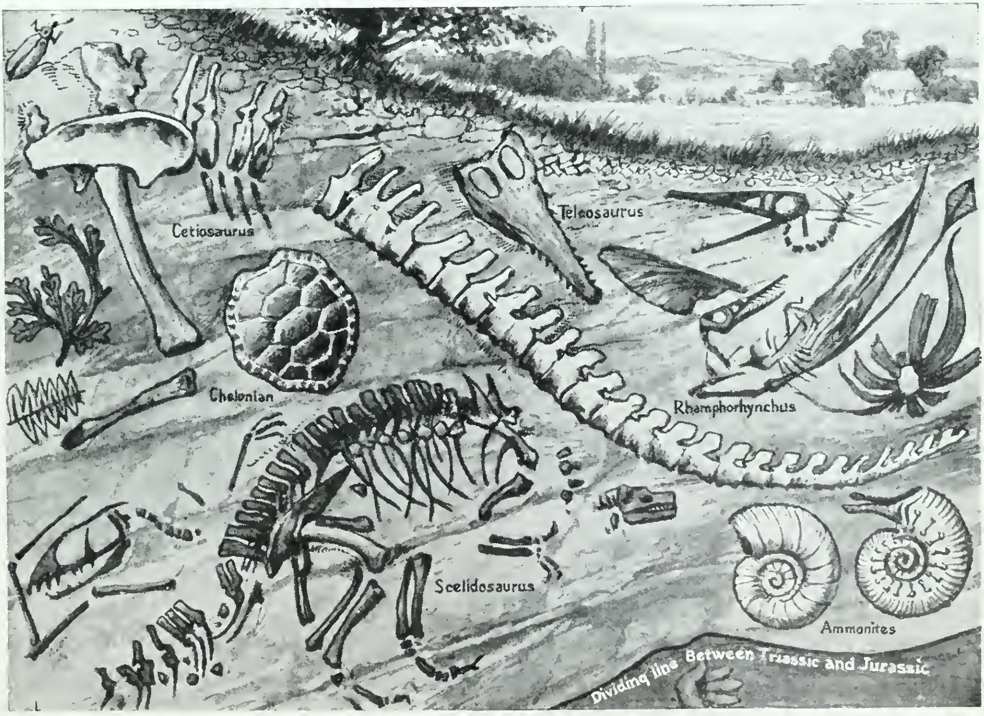
Most of these Jurassic monsters, however, were not quite so formidable as they appear, for they were probably very clumsy and sluggish in their movements, and their teeth show that most of them were vegetarians.

THE NEXT STORY OF THE EARTH IS ON PAGE 1659.

LIFE AND REMAINS OF THE JURASSIC PERIOD

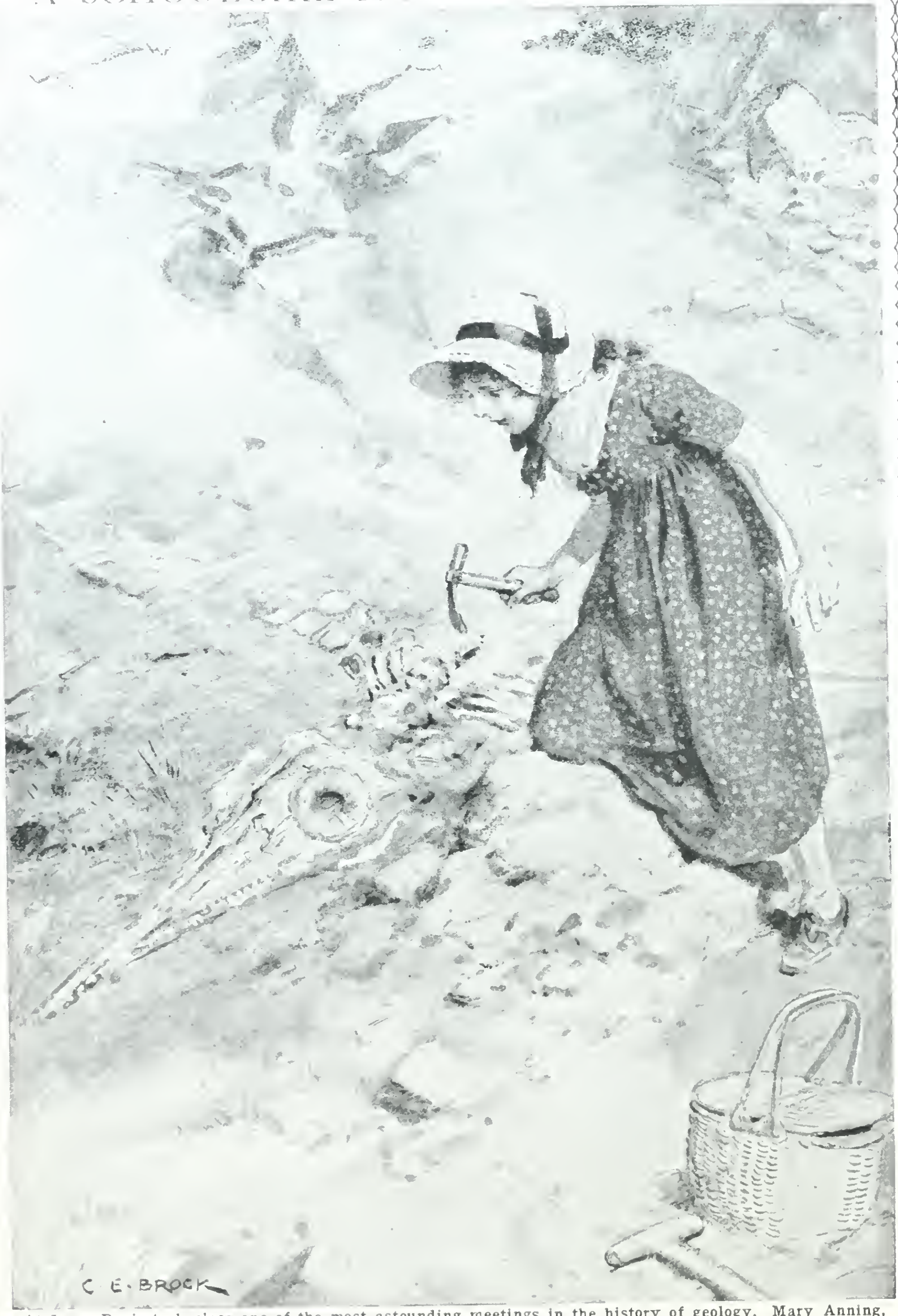


The world in the Jurassic Period, showing flying dragons, a crocodile and other creatures.


Cetiosaurus
Teleosaurus
Chelonian
Rhamphorhynchus
Scelidosaurus
Ammonites
Dividing line Between Triassic and Jurassic

Section through the rocks of the Jurassic Period, showing fossils of the creatures seen above.

A SCHOOLGIRL MEETS ICHTHYOSAURUS



At Lyme Regis took place one of the most astounding meetings in the history of geology. Mary Anning, aged 12, coming upon the first ichthyosaurus found in England.

The cattle that give us leather.

NOTHING LIKE LEATHER

STORED up in our popular proverbs is a vast amount of truth and sense, based upon the experience of men who have lived in all ages of the world's history. According to one of these proverbs, "there is nothing like leather," and although we do not know who first made that statement, we do know that it is true. There *is* nothing like leather, and though clever men have worked hard to invent a substitute for leather, they have not been entirely successful. The demand is ever growing and has always exceeded the supply.

Leather comes from the skins of animals, and every bit of leather in the world was once alive. Leather-dressing was one of the most important trades among the ancient Egyptians, and at Thebes, in the days of Egypt's glory, a special quarter of the city was set apart for the tanners. So great was the demand for leather that Egypt itself could not provide enough skins. One of the forms of tribute exacted from conquered nations was a number of skins, to be delivered every year for the making of leather by the skilled Egyptian tanners. In our museums we can see to-day splendidly preserved leather straps and belts used for binding round the mummies of men who lived far back in the days of Solomon. The mummies themselves, as they were carried to burial, were often covered with a pall, or canopy, of soft leather dyed a delicate blue. The Egyptians used leather for making sandals, braces, belts, bags, shields, harness, sails, cushions and chair-seats. From them the Israelites learned the art of tanning, and although the word leather occurs in the Bible only twice, there are many references to "skins," which clearly mean leather.

The Greeks and Romans made leather, and indeed it is difficult to find any nation, ancient or modern, civilized or uncivilized, to whom leather has not been known. The most extraordinary things have been made of it. The Romans at one time had coins of leather, and some of the early cannon were made of leather.

In the making of leather from the rough skins of animals different processes are used, but they are all based upon the same principle, and are very similar. The skin of an animal is largely composed of gelatine, which decays if exposed to air and moisture. In making leather we strive so to treat the skins that new compounds are formed which are lasting and flexible. It is curious to know that the methods used by the Egyptians three thousand years ago are very much like methods still in use. In most other industries modern science and invention have completely transformed the process of manufacture, and made it possible to do in a tenth of the time, and with a better result, work that was formerly done by hand. In the tanning of hides and skins it has not been possible to improve the process so much. The old methods are slower, but for many kinds of leather they are better. However, much machinery has been invented, and many changes in the processes have been made.

The animals whose skins make the best leather are those living in hilly countries, where there are great changes in temperature. The skins of the big cattle that we see in shows are of very little use for leather. Young animals provide better leather than old ones.

HOW SKINS ARE MADE INTO LEATHER

In making some kinds of leather the skins are allowed to ferment until the hair is loosened. For other kinds the skins are often treated with lime and sodium sulphid. A curious fact is that the lime used must have been used before for other skins. It was once thought that the lime itself, by some chemical action, loosened the hair. As a matter of fact, fresh lime tightens the hair in the skin. The old lime, owing to its contact with former skins, is full of bacteria, the tiny creatures that we can see only through a very powerful microscope, and these bacteria make their way down into the epidermis, destroying the roots of the hairs so that they come away easily. This fact explains the why and wherefore of a process that has been known and used for thousands of years.

We can follow the skin through some of the other processes by the pictures. They differ somewhat according to the general method of tanning and according to the kind of skins. Generally the odor around a tannery is not very pleasant.

The old method in use for thousands of years was to soak the skins in liquid containing tannic acid. This is obtained from the bark of many trees, and the wood of some also contains a considerable amount. Oak bark has been long used. The acorns of an evergreen oak found in Greece and Asia Minor have even more tannin. The bark of the hemlock and the chestnut and the mimosa contain much tannin. One variety of the quebracho, a South American tree, furnishes much tannin. In some parts of the world the supply of trees or plants containing tannin is almost exhausted.

SOME IMPROVEMENTS IN TANNING PROCESSES

Recently great progress has been made in the manufacture of artificial tannin. The word used to describe a product made from chemicals which is the same, or almost the same, as a natural product, is "synthetic." So these products are called synthetic tannins.

Considerable use is made also of a part of the waste of a paper mill. It is usually called wood-pulp extract or some such name. It is not used alone, but is combined with the tannin and hastens the process.

Skins may also be tanned by the use of the chromium compounds, and the product is called chrome leather. This process was discovered during the last century. Only a few hours, instead of weeks or months, are required, and for some purposes the leather is quite as good as, or even better than, that made by the older process. Some leather is prepared by a process called tawing. This hardens and preserves the gelatine instead of changing it. The important thing here is to soak the skins in a solution of alum and salt. Chamois leather is prepared by working oil into the skins after they have been removed from the lime and the lime has been washed out. Russia leather gets its pleasant odor from the birch bark which is used in preparing it.

THE ANIMALS FROM WHICH WE GET OUR LEATHER

The skin of almost every animal can be tanned, but the main sources of our supply of leather are: cattle, young and old, sheep, goats, pigs and dogs. Our shoes are generally made from the skins of calves or goats, though horsehide provides an excellent leather. It is much used for the boots of sailors and fishermen because it is nearly waterproof. Pigskin makes a tough leather, much used as a covering for saddles and also for pocketbooks and bags. The skins of snakes, lizards, frogs and alligators are often used in making bags, lettercases and the like. Our gloves are made from the skins of kids, lambs, dogs, and sometimes from deerskins.

Considerable fine leather is made from the skin of seals—not the fur seals, but the hair seals caught in the Atlantic Ocean—and also from the skin of the walrus. Porpoise leather, really coming from the white whale, is very strong. Elephant, rhinoceros and hippopotamus hides make heavy, thick leather. Strips of such leathers are often fastened to the rims of wheels and used in polishing metals, especially in the cutlery industry. A few skins of sharks, buffaloes, antelopes, donkeys and kangaroos are tanned, but hardly enough to count. The so-called chamois leather is made from the fleshy side of sheepskins.

THE MANY MACHINES USED IN MAKING LEATHER

As the demand for leather increases, it has been found possible to split the hides. In fact, three sheets of leather are sometimes made from one hide. When this is done, the outer, or hair, side is good, the middle less strong, and the fleshy side has little strength, and neither looks nor wears well.

The reason is that the world is less and less able to get enough leather for its needs. Leather is generally what is known as a by-product; that is to say, the animals are reared and killed, not for their skins, but for their flesh; and as the skins happen to be there, they are used for making leather. But as people are now eating less meat than they used to, and it would seldom pay to rear animals simply for their skins, the supply of leather is growing smaller.

LEATHER CONSTANTLY GROWING MORE EXPENSIVE

During the last few years the price of some leathers has doubled, and other kinds cost several times as much as they formerly did. Your father has noticed that shoes cost a great deal more than they did a few years ago. The uses of leather have increased also until we count them in hundreds. Leather is used for the great belts that drive big machinery and for the small buttons on a boy's coat; it is used for upholstering a motor car or a carriage, and for making a purse; many people of other lands who used to wear wicker sandals or wooden sabots now wear leather boots and shoes. In the World War an enormous quantity of leather was used for boots, leggings and other articles, so that far more leather is being asked for than can be produced.

As yet artificial leather cannot compete on equal terms with the real hides, although inventors have made substitutes which are used not only for bookbinding, upholstering motor cars, and making bags and purses, but also even for the soles of shoes. The Japanese, who are great leather-users, and whose ornamental leather work is very beautiful, have an imitation made from compressed layers of paper spread with a mixture of rice paste and lamp black. A Belgian invention consists of heavy cotton cloth impregnated with substances containing tannin and albumin. Several German substitutes are in use, and a good many American ones. Some of these are better than the inferior leather, and their use is likely to increase. Tops for most motor cars are now made of these substitutes, and much furniture is covered with them.

CELLULOSE THE SECRET OF LEATHER SUBSTITUTES

It may be a surprise to us to know that we can buy shoes that look like leather but are really synthetic shoes. The soles are made of rubber or of a substance made of wood-pulp. The uppers are made of a fabric or canvas coated with a solution of cellulose that is flexible and waterproof. Cellulose forms the greater part of the framework of all plant life. A sheet of paper is almost pure cellulose. Knowing that, we can realize what a difference there is between shoes made of these synthetic materials and shoes made of real leather.

The first attempt at making something to take the place of leather resulted in the old-fashioned oilcloth. This was simply canvas painted or printed with linseed oil and certain color materials. Later cork was mixed with the linseed oil and the result was called "linoleum." The next step was to drop the natural oil and use a cellulose solution called collodion varnish. Most of us know collodion varnish through putting it on our cut fingers; as the air reaches this varnish it dries until it is like a piece of skin. For book covers, purses, belts, cushion covers and other articles this collodion varnish is colored any desired shade. Then the coated fabric is passed between rollers which stamp it to represent the grain of any leather—even snake or alligator.

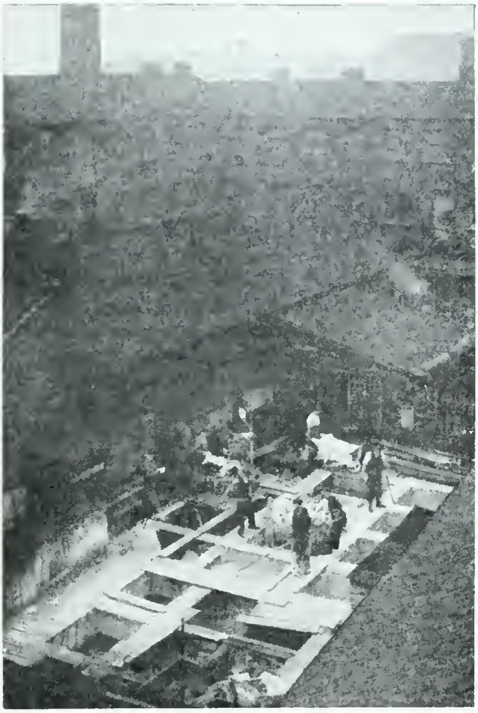
THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1663.

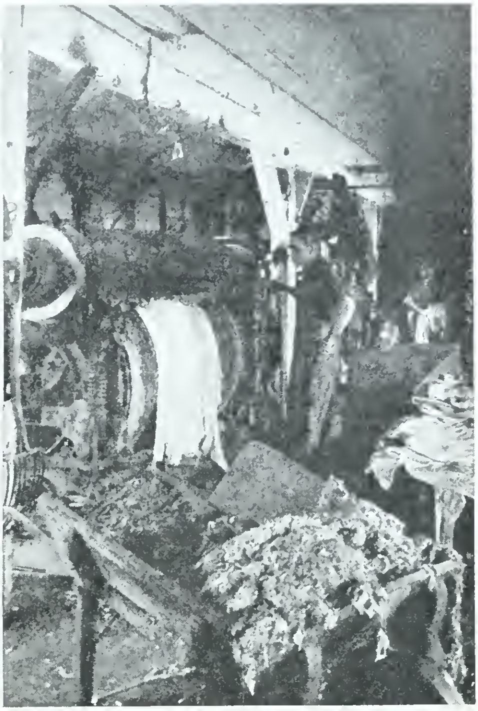
PICTURE STORY OF LEATHER

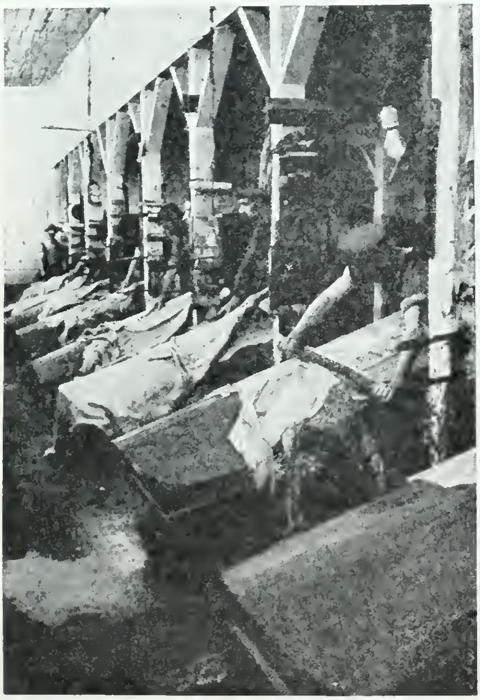
Millions of skins from all parts of the world are collected and sent to the great tanning centres, where leather is prepared for a variety of purposes. Here we see Russian skins starting to the tanneries.

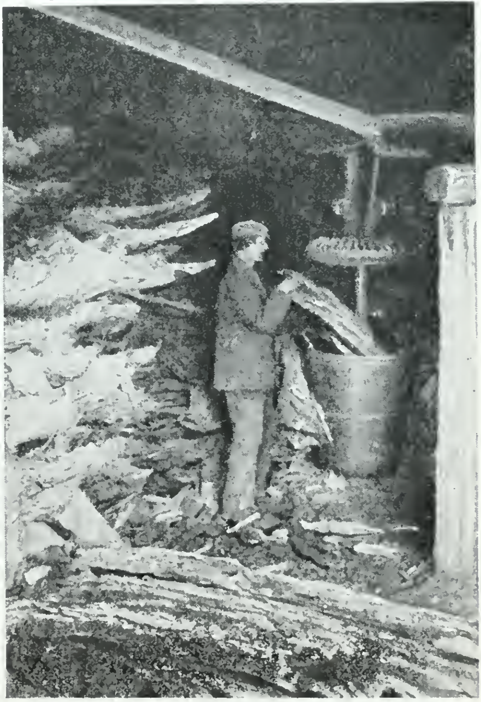
The great slaughter-houses in many parts of the world are an important source of skins for the tanneries, and here we see thousands of skins being dried before being sent off to their destination.

PREPARING THE SKINS FOR TANNING

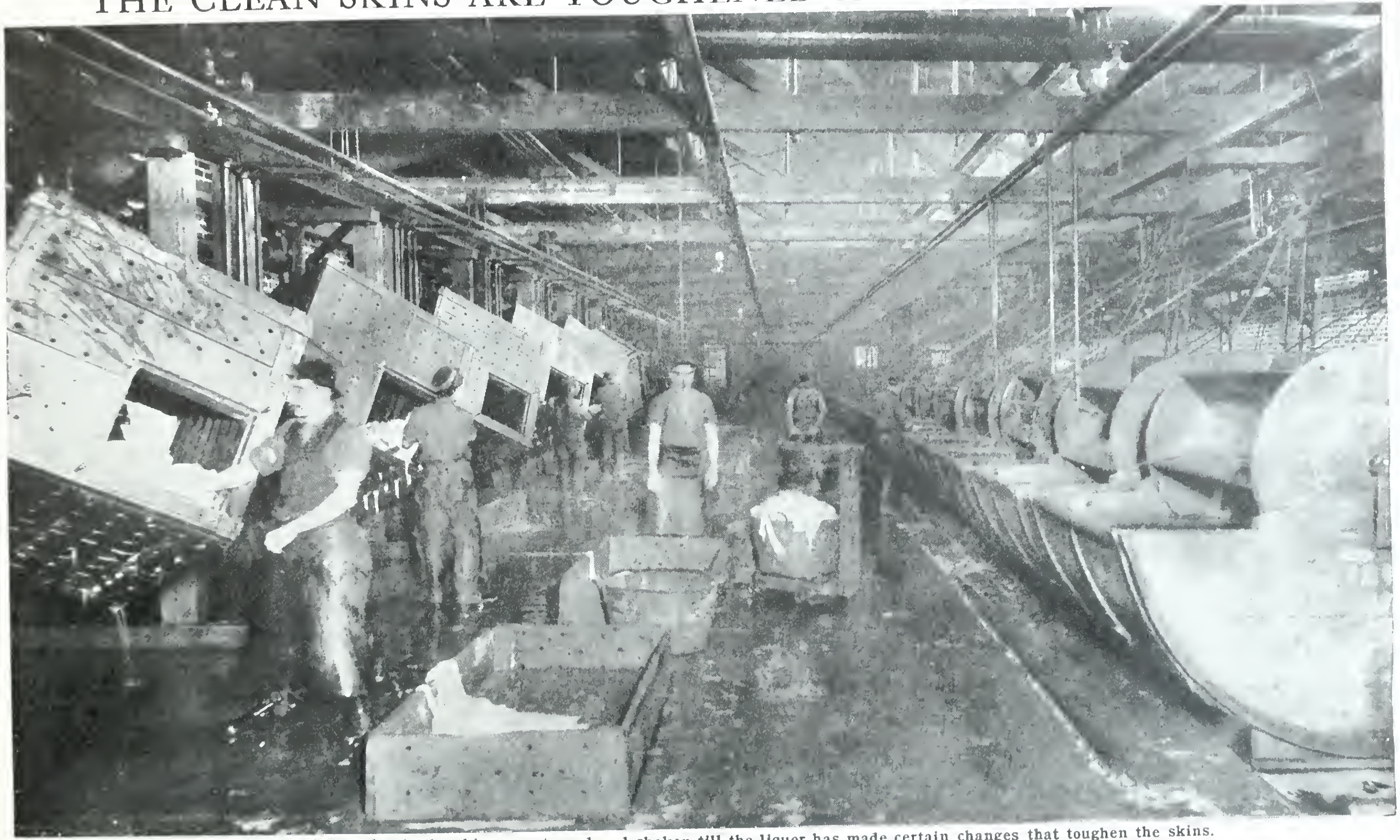

On arriving at the tannery the skins are placed in vats with lime to loosen the hair or wool.


The skins are then run through machines which scrape the greater part of the hair from the skin.


Men now take the skins and, placing them on sloping boards, scrape the remainder of the hair away.


After further cleansing, skins are placed in tanning liquors. Here bark containing tannin is being ground.

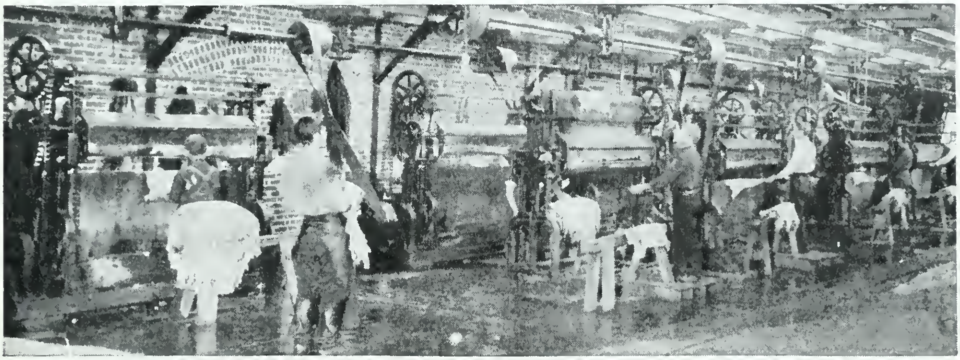
THE CLEAN SKINS ARE TOUGHENED IN THE TANNING VATS



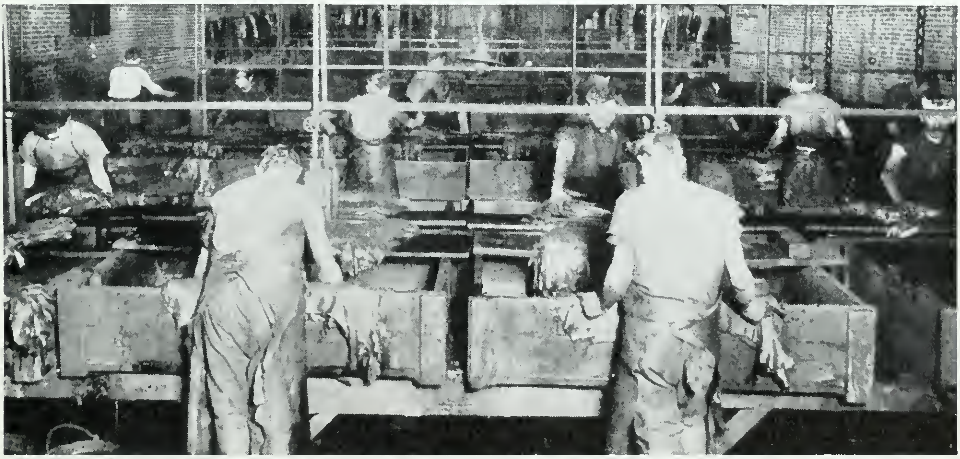
In these tumblers and vats the skins are steeped and shaken till the liquor has made certain changes that toughen the skins.

DYEING THE LEATHER AFTER TANNING

The skins are kept in the vats until they are thoroughly saturated with the tanning liquor.

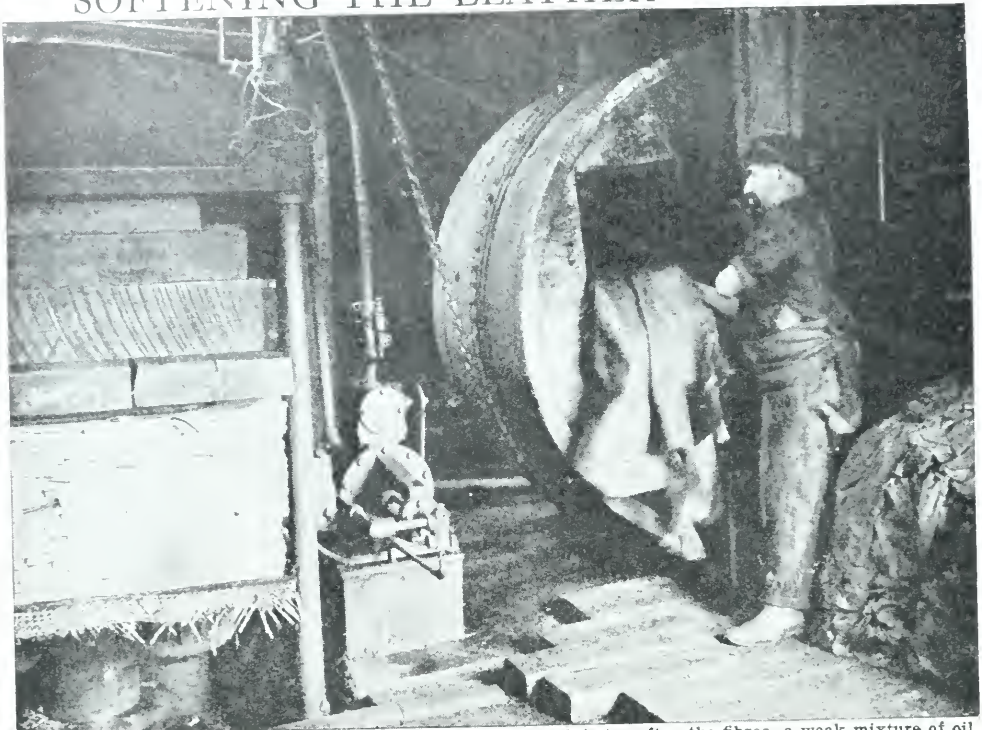


The skins may be afterward immersed in various other liquors which still further carry on the curing process, and then the work of striking out, or stretching and smoothing, takes place.

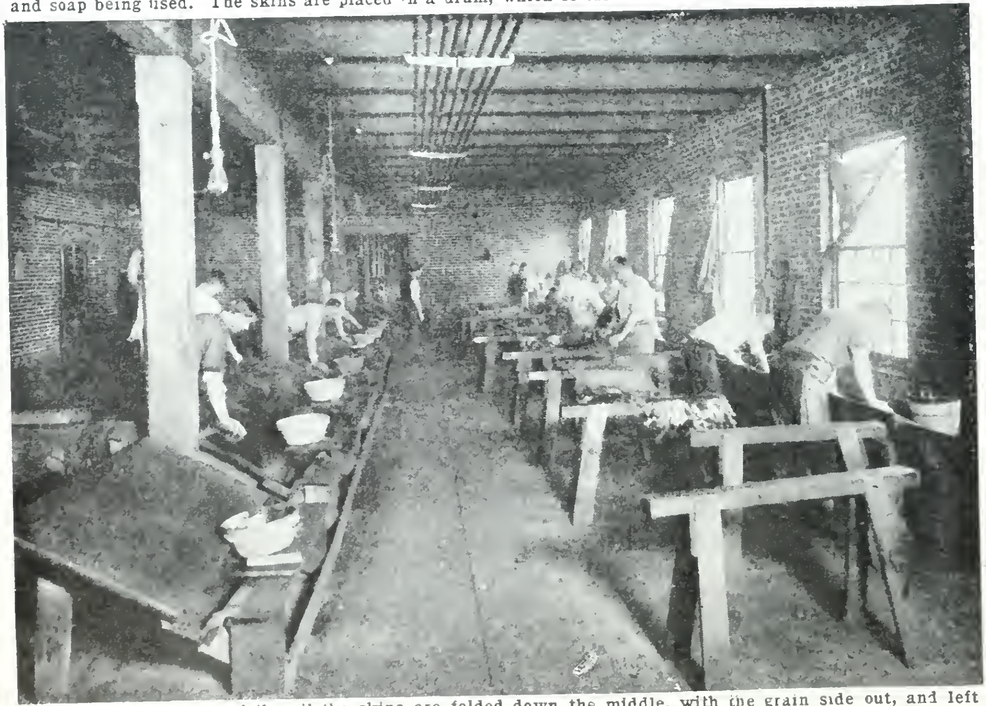


The skins are now shaved down to a uniform thickness, and are next dyed. The skins are placed in piles in wooden trays containing the dye, and moved about from time to time to obtain even coloring.

SOFTENING THE LEATHER WITH OIL

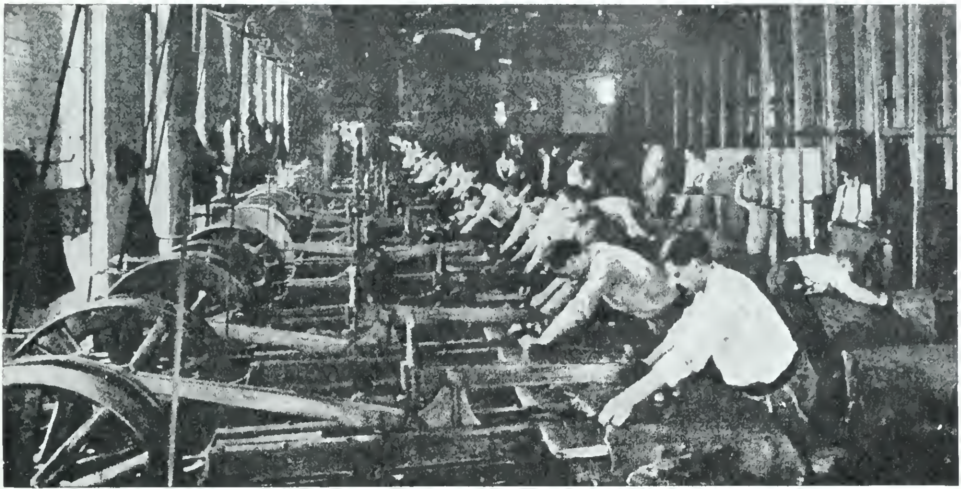


The next process is known as fat-liquoring, the object of which is to soften the fibres, a weak mixture of oil and soap being used. The skins are placed in a drum, which is turned until the oil penetrates the leather.



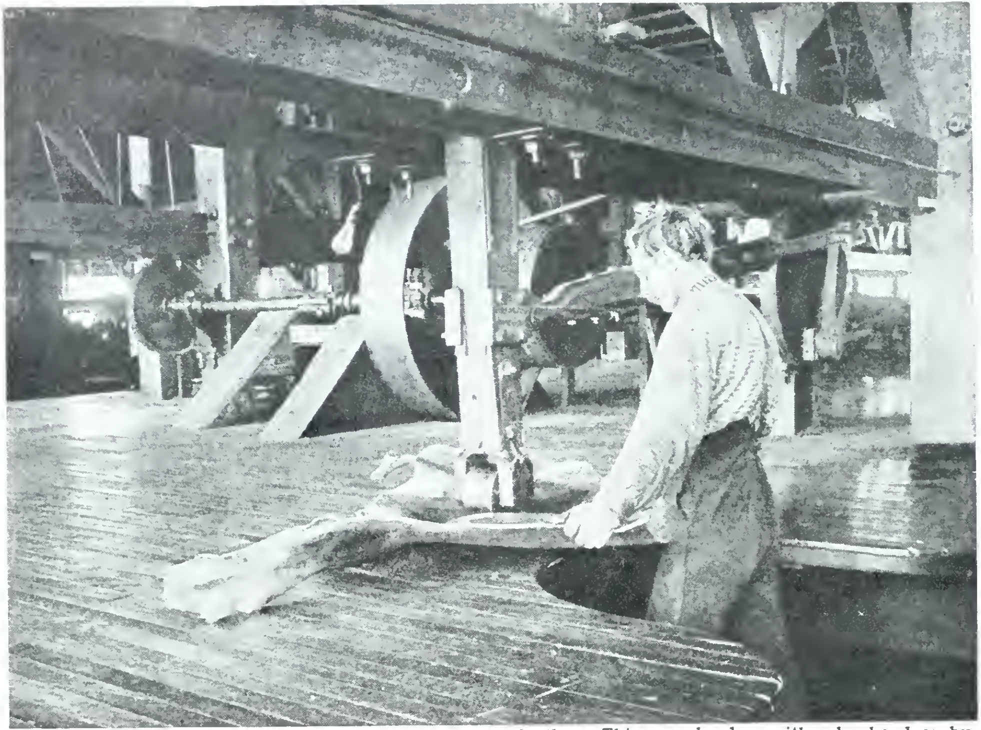
After being taken out of the oil the skins are folded down the middle, with the grain side out, and left for a day or two. Often the oil is also worked into the leather by hand, to increase the suppleness.

FINISHING THE LEATHER FOR GLAZING

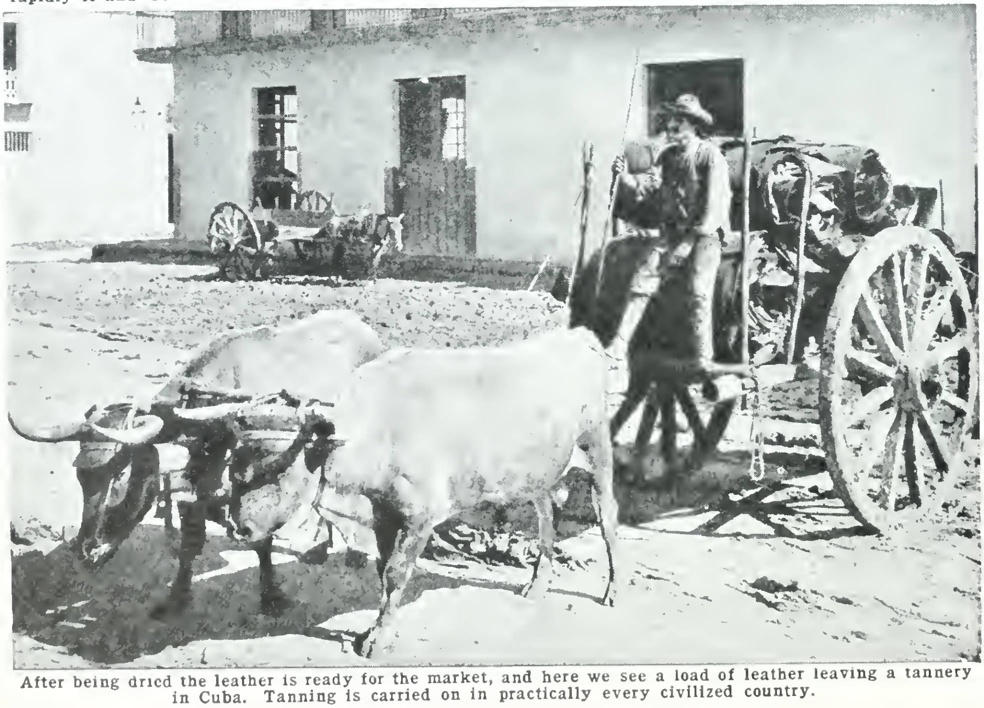

The leather is stiff after dyeing and needs softening. It is damped with wet sawdust, and goes through a process known as staking, which was formerly done by hand, but is now performed by a machine.

The skins are hung up to dry and the ragged edges are trimmed off. Then the leather is seasoned—that is, the grain side is wiped over with a mixture known as season, made up of logwood, milk and other ingredients.

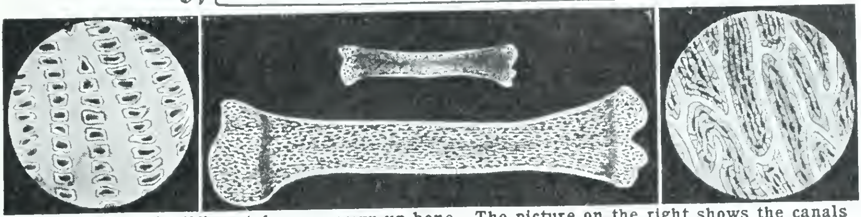
THE LEATHER GOES TO MARKET



Only one thing now remains, and that is to glaze the leather. This may be done either by hand or by machine. The actual glazing is done by a small cylinder of glass or agate working on an arm and passing rapidly to and fro over the leather. Thicker kinds of leather, like sole leather, are simply ironed.



After being dried the leather is ready for the market, and here we see a load of leather leaving a tannery in Cuba. Tanning is carried on in practically every civilized country.



A growing bone is different from a grown-up bone. The picture on the right shows the canals and the red blood-cells of a grown-up bone. On the left are the growth-cells of a growing bone. The dark part on the small middle picture shows the growth-power of a child's bone, which disappears as the bone grows larger.

HOW OUR BODIES ARE BUILT UP

WHEN the bodies of animals became larger and able to do a greater variety of things, it was necessary that the body should produce in itself some hard parts. These would serve to protect it and also act as a kind of scaffolding to hold the body together. We may call the hard part of an animal its *skeleton*, and if we compare, for example, a lobster with a herring, we shall learn the first interesting thing about skeletons.

An animal may have its skeleton outside its body or inside its body. The lobster's skeleton is outside its body, and its muscles are inside its skeleton. In the case of the herring it is the other way round. The older kind of skeleton is the lobster's kind, and when we study all the forms of animal life we learn how to trace the newer kind of skeleton which has the rest of the body outside it, and which we see in the fish or in ourselves. All the animals that have their skeleton on this pattern inside their bodies are called Vertebrates, from vertebræ, the name of the little bones that are piled against each other to form the backbone. Instead of vertebrates we may say backboned animals, for that comes to the same thing.

The animals that have no backbone at all are called Invertebrates, a word that means simply "not backboned," and many of these are quite familiar to us and have already been described in this book. For instance, oysters, jellyfish, snails, moths, butterflies and sponges are examples of invertebrate creatures.

By far the most important and wonderful animals in the world are the backboned animals, and our own bodies belong to this great class. We find that we can arrange the backboned animals into a few great groups, and the way to understand our own skeleton and bones is to study the development of the skeleton from the simple backboned animals.

The lowest kinds of backboned animals are the fishes. Although the first fishes were very humble and simple compared with even a herring, a herring will do quite well for our present purpose. Its head is at the end of a column of small bones. This column is its backbone, and the small bones are its vertebræ. It would be easy to spend many pages in discussing how the skull comes to be formed at the end of the backbone, but we must leave that great question. At any rate, the skull contains the brain, and the brain runs down from the head through the backbone, or spine, in the form of a long cord of nervous matter, which is called the spinal cord. The great business of the bones of the head is to protect the brain.

That is true in the case of the herring, and it is true in the case of ourselves. We could scarcely get through a week if we had not the skull to protect the brain. And so now we can learn at once that, even in the vertebrate animals, the most important part of the body is still inside the skeleton and not outside it.

THE WONDERFUL DEVELOPMENT OF THE FISH'S FIN IN HIGHER FORMS OF LIFE

But if we consider the herring further, we find something lacking in it which we know very well in the case of the frog or the horse or ourselves, and that is—limbs. We must go to the next group of vertebrates, called the Amphibia, to find these. Any frog will soon teach us what limbs are. They correspond to the long side fins which were developed in the fishes. When we look at the skeleton of a frog, we see that it consists of two parts. One is the part which lies along the length, or the *axis,* of the frog, and this is usually called the *axial* skeleton. It is different in some ways from what we saw in the herring, but it is really the same thing as the herring's skeleton, but, in addition, the frog has four sets of bones projecting sideways and outward from the axis of its body, which are its four limbs.

There is no exception to the rule that of all the thousands of kinds of vertebrate animals above the fishes, from the frog up to man himself, every one has four limbs at some stage in its history. This is true of the whale and the seal, and even of the snake, though in these and some other animals the limbs may have become so small that they are not visible when the animal is grown up.

THE MARVELOUS UNITY IN ALL KINDS OF CREATURES, FROM FROG TO MAN

It is one of the most interesting things in the world to find this wonderful unity of plan. It shows itself without exception onward from the remote time when the four limbs of such a creature as the frog developed. No matter whether the creature is a crawling snake or a bright lizard running quickly in the sun, or a whale swimming in the water, or a bird flying in the air, or a dog, or a man, its skeleton is formed on the principle of a backbone made up of little pieces, but stretched and hollowed out at the front end to hold the brain; and of two pairs of limbs, one in front and the other behind.

Another thing we notice about the skeleton of all these creatures—a thing which greatly adds to their grace and beauty—is that it has two sides very much like each other. This character about a thing is called *bilateral symmetry*, which means measuring one side with the other. You can measure one arm against the other, and so on.

This two-sided symmetry is part of the plan of the body, and it applies not only to the skeleton on which the body is built, but also to everything. It is not always exact, for we find that two sides of the same face are not exactly the same; that the two arms are not exactly the same length. But still this two-sided symmetry of the body is a thing we can all see, and it is based on the two-sided symmetry of the skeleton.

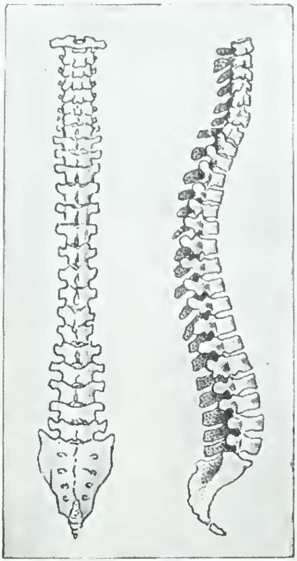
The framework of the body is not the framework of a thing that is to stand still, but of a thing which is to move. A tree has a harder part which is, in a sense, its skeleton; but a tree is a plant, and the rule about plants is that, as they can feed on air and light and earth, they can stay where they grow.

THE JOINTS OF OUR BODY, AND HOW OUR MUSCLES CONTROL THEM

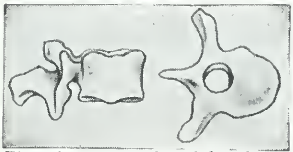
But an animal's food is not to be found everywhere, and as its food will not come to it, the animal must go in search of its food. Therefore, one of the great marks of an animal is that it moves about, and its framework has to be of a very special kind. The animal moves, not because it is blown or pushed from without, but because it is able to bend certain parts of its body upon other parts of its body.

It is plain, then, that it will not do to have a skeleton made all in a piece or made of pieces that are buckled firmly together like the framework of a house or a ship. So, wherever movement is going to be required we find the skeleton made of separate pieces with joints between them. We have never thought much about joints, perhaps, but engineers have to make joints whenever they build a motor car or a steam engine. They have to keep the joints working smoothly if they can; but no engineer ever made a joint a thousandth part as wonderful and perfect and durable as the joints in our body. The bones, however, have no power of movement in themselves. If they are to move, something must pull them. The things which pull them are the muscles, and most muscles run from one bone to another *across a joint.* When the muscle shortens, it bends the one bone on the other at that joint.

Plainly, then, the skeleton is much more than a framework for the body, but we have not discovered all its duties yet. The skull and the backbone are not merely supporting, but protective. Within them there lies the precious nervous substance which guides and directs the whole of the body. Lastly, as if they had not enough to do, many of the bones contain inside them the millions of cells which are ceaselessly engaged in turning out new red cells for the blood. Sometimes the red cells of the blood are destroyed too quickly and have to be made more quickly than they ought to be. Then we find that the various bones get filled more and more with the living cells which make red cells for the blood—so much so that if the need for an extra supply of red cells continues, the bony part of the bone will almost disappear, and the bone become apt to break. It is well for us to know this, because we are inclined to think of our skeleton as if it were something lifeless inside us, and nothing could be farther from the truth.



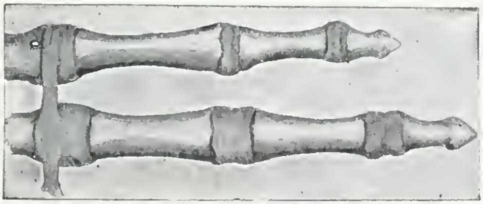
These pictures show the backbone as seen from behind and from the side. Below are views of a single bone.



The picture on the right shows the hole through which the spinal cord passes down the backbone from the brain.

If we go back to the fishes for a moment, we shall learn that the bones begin in the shape of something not really bony, but gristly. The proper name for gristle is cartilage, and most of our bones are made of cartilage to begin with. Then true hard bone is laid down inside the cartilage in a fashion so wonderful that, compared with it, the building of a breakwater under the sea is really a simple and easy matter.

The bones of small children are not completely bony: they are more gristly really; and sometimes in a case where the bone of a grown-up person would have broken, the bone of a child simply bends instead of cracking, just as the green branch of a tree will bend instead of snapping. So this kind of fracture is called a "greenstick fracture." No child, boy or girl, could grow up if its bones were like those of grown-up people. If a child's bones were finished things, there would be no way of enlarging them to perhaps three times the length that they were, and two or three times the thickness.



The middle and third fingers of the hand, showing the connecting ligament.

Some day you may have a chance of seeing through the microscope the wonderful way in which the bones are built: some cells laying down new bone; other cells coming along and scooping it out just where it ought to be scooped out, and so on. The mind of the wisest and soberest man may almost reel at such a sight, when he asks himself how and by what knowledge each of these tiny specks of living matter does its work in the dark for the good of the body, of the very existence of which it cannot have the smallest notion. Perhaps the people who say that human life is not worth while, and ask what is the good of us all scurrying backward and forward, living and dying, and soon being forgotten, may learn from the building of a bone that men and women may be engaged in making something as much beyond their imagining as a man's body and life and thoughts and deeds are beyond the imagining of the cells that built his bones in darkness and silence.

It takes years to know the skeleton thoroughly, to understand the use of every little part of every bone; to be able to recognize even a small piece of any bone when we see it; to know whether it is a human bone or the bone of an animal, and to know which side of the body it comes from. Knowledge of that kind is necessary only for the doctor. Here, however, we can learn some of the great facts about the skeleton.

Let us begin with the axial skeleton, the oldest part, and with the oldest part of it, which is the backbone. This is made up of several quite small pieces resting on each other, and that fact has two interesting things for us to think about.

One is that all creatures which have backbones resemble those creatures whose bodies are made up of many pieces very like each other, joined together—such, for instance, as a worm. Even the human body has many traces in its structure of this similarity to a creature whose body is made from pieces called segments. Now, just as the segmented structure of the worm greatly helps its movement, so in practically every one of our movements we benefit by the fact that our backbones are made up of little pieces. If the backbone were really a single bone, our lives would scarcely be possible. Even when we move our arms only, we alter the balance of the body, and it is necessary that the curve of the backbone shall be slightly altered. One of the uses of exercise, especially of play and games for children, is that they make the growing backbone supple and help us to get control of it, so that we are not clumsy when we grow up.

HOW IT IS THAT WE CAN STAND ERECT WITHOUT FALLING

The vertebræ that make up the backbone differ in size and shape. Those in the neck, for instance, are much smaller than the large ones in the small of the back, which have a great weight to carry; those between the two are different again, because they have attached to them the ribs—the long, curved, slender bones which help to make the wall of the chest. We find that in all sorts of animals the shapes and even the number of the different vertebræ correspond wonderfully. For instance, there are seven vertebræ in the neck of nearly every mammalian animal, as there are in ourselves. The giraffe, with its very long neck, has seven vertebræ, as we have read, and so has the whale, which seems scarcely to have a neck at all.

There are two great differences between the backbone of man and the backbones of other animals. One is that the backbone of man is very much shorter. In most animals the backbone runs right down into the tail, and there are vertebræ in the tail, as there are anywhere else. But the tail of man is represented by only four tiny vertebræ which have got squeezed together into a single small bone, and which are of no use, and perhaps are even getting smaller still.

THE TWO GREAT STRAPS THAT ENABLE US TO STAND ERECT

The other great difference between human and animal backbones is the way in which the backbone of man is curved. There is a great difference between the curve of a baby's backbone and that of a grown-up. In the baby and in four-footed animals, and even in half-erect monkeys, the backbone is so curved that the weight of the body is bound to fall forward unless a very special effort is made. A dog can be made to walk on its hind legs, but this is not natural and needs a special effort. But the curve of the backbone in ourselves after we have passed the first baby stage is quite different; and, as the body is built on and around the backbone, the result is that in ourselves, and in ourselves only, the weight of the whole upper part of the body tends to roll backward.

Now, on the front of our hip-joints we have two great straps of strong fibres called ligaments, which prevent our heads and trunks from rolling backward when we stand up. Other creatures have these bands of fibres, but in them they are tiny, while in us they are the biggest and largest in the whole body. It is because our backbones are curved as they are, and because we have these bands of fibres in front of our hip-joints, that we can stand erect with scarcely any effort at all. This means that we can use our arms, not for mere walking or standing, but for all the many things, like writing and sewing, which help to make us human.

THE BEAUTIFULLY FITTING VERTEBRÆ THAT MAKE UP OUR BACKBONE

If we look at a single vertebra—not taking any one in particular, but an average one—we find that it is a very irregular, and yet a very regular, piece of bone. It has a solid piece called the body, and these bodies are piled upon each other like a pile of coins, and so make the spinal column, or backbone. Opposite the body is a point projecting, and we can readily see or feel the long row of these points in ourselves or other people running down the middle of the back. These points, and the others at the side of the vertebræ, have muscles and strong cords of fibres attached to them. The vertebræ are so beautifully and perfectly bound together in this way that it is practically impossible for any accident to disjoint or dislocate any part of it unless it is broken as well.

The other great feature of the vertebra that we notice is the large hole in the middle of it. When the vertebræ are all put together to make the backbone, these holes go together to make a long tube, which opens at the topmost vertebra and runs right down almost to the end of the backbone. Lastly, if we see a number of the vertebræ put together, we find that, even though they are so beautifully and tightly jointed, yet between every two vertebræ on each side there is a hole.

HOW ALL OUR THOUGHTS AND FEELINGS ARE CARRIED THROUGH A TUBE

Now the tube made by all the vertebræ put together holds the spinal cord, without which we cannot move or feel or live; and the little holes at the sides, between every two vertebræ, carry the great spinal nerves which leave the spinal cord and are distributed to every part of the body, even to the skin of the smallest toe, as you will know if you have a corn; and these nerves carry from the spinal cord all the orders to the muscles, and to the spinal cord all the feelings from the skin and so on.

It is plain that there must be some great hole in the skull which, so to speak, lets the spinal cord through from the skull into the spinal column; and that is so. When we look at the skull as it is balanced on the backbone, the most noticeable thing at the base of it is a large hole, and on each side of it there is a very smooth little place. These smooth places fit on to corresponding smooth places on the top vertebra, and every time we move our head the skull rocks on the top vertebra at these two places. The hole between them exactly corresponds to the large hole in the top vertebra—which is, indeed, scarcely more than just a ring of bone—and it is here that the lowest part of the brain is continued into, and becomes, the spinal cord.

HOW THE SPINAL CORD FLOATS IN THE TUBE

It is the brain that feels and the brain that wills; and every message sent by our body and limbs to the brain travels along the nerves to the spinal cord, and then through its great hole at the base of the skull up into the brain. Every message from the brain passes out through the spinal cord to the nerves and through the nerves to the limbs.

The spinal cord is wonderfully protected by the backbone. Inside the backbone it lies inclosed in a sheath, or coat, filled with fluid, in which it floats. Thus a blow on the backbone—unless it is a very hard one—and the movements of the backbone do no harm to the spinal cord; it does not feel them, for the water-bed in which it floats protects it. Also the backbone and all the muscles round it protect the spinal cord perfectly from the sun. The one place where it is not quite so well protected as anywhere else is the back of the neck, and in people who are not very much accustomed to the hot sun this is the place where they need to protect themselves from sunstroke. There is very good sense in putting a handkerchief, or something of the kind, over the back of the neck in very hot weather, and so protecting the one place where the central part of the great nervous system is rather more exposed than anywhere else. But remember that even here nature has provided a protection in the hair, which helps very greatly to protect the brain itself from sunstroke.

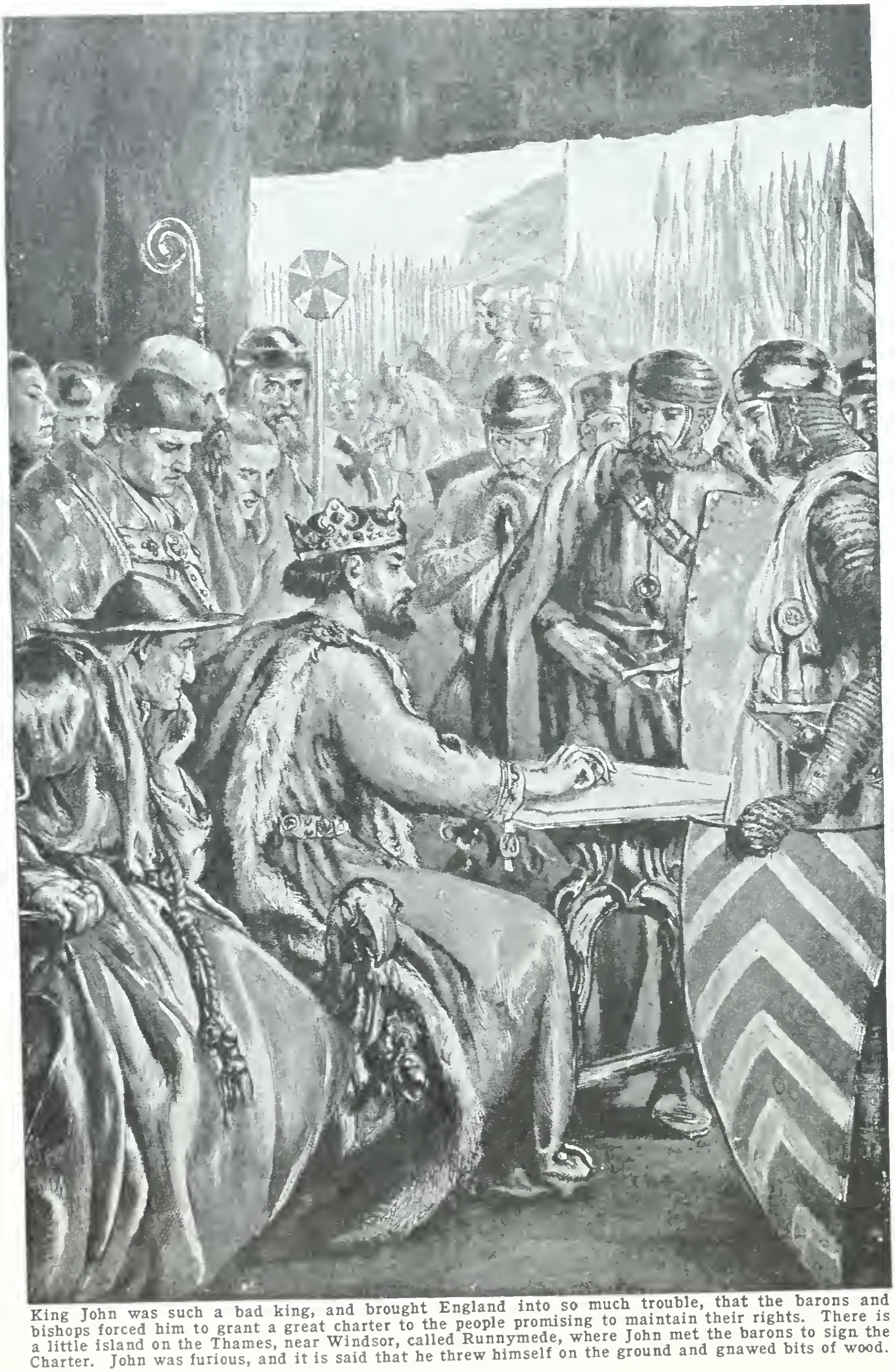
THE BACKBONE ROUND WHICH OUR BODIES ARE BUILT

At its lower end the spinal column is jointed to the great hip-bones, from which the bones of the leg spring. At this part of the spinal column we find five vertebræ jointed together into one bone. Long ago it was supposed that the soul lived in this bone, and it is still known as the sacrum, or sacred bone. The names of nearly all the bones are Latin, as that was the language formerly used by all learned men everywhere.

Higher up, below the neck vertebræ, and above those that make the small of the back, is the row of twelve vertebræ from which the ribs spring—twelve on each side. Most of the ribs in front are joined to the breast-bone, which you can feel in yourself very easily, and this bony case contains organs inside it; while outside it are placed the collar-bone and the shoulder-blade, from which spring the bones of the arms. If now we just remind ourselves that the skull is balanced on the top of the backbone, we shall see how much good sense there is in such a saying as that good homes are the *backbone* of any nation. It is around and upon the backbone that everything is built, and without the backbone everything else would go to ruin.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 1673.

KING JOHN SIGNING THE GREAT CHARTER



King John was such a bad king, and brought England into so much trouble, that the barons and bishops forced him to grant a great charter to the people promising to maintain their rights. There is a little island on the Thames, near Windsor, called Runnymede, where John met the barons to sign the Charter. John was furious, and it is said that he threw himself on the ground and gnawed bits of wood.

THE HISTORY OF ENGLAND

THE Normans left their mark on England, and their influence works in our life even now. But it was not all real progress after the death of the Conqueror. There was still fighting for the crown, and the throne was all the more insecure because the kings of England ruled over provinces in France stretching away to Spain. The Conqueror was succeeded by his son, William Rufus, who was succeeded by Henry I and Henry II. Then came Richard, who was nearly always away fighting. After Richard came John, a bad king, whose reign is important because the real power of the people then began. The barons forced John to sign the Great Charter which gave England freedom and good laws. John's son Henry became king at nine years old, and in his reign the people took another great step forward by founding Parliament, the Great Council of all the people, which has grown until, in our own day, it is the chief power in the land.

THE BEGINNING OF FREEDOM

WHEN Taillefer, the minstrel, led the Norman army to victory at Hastings, tossing and catching his long sword as he rode forward on his gay, prancing horse, the words of his bold song were in French. What a roar of deep bass voices as the whole army behind him took up the air!

When the voice of the archbishop rang out in Westminster Abbey two months later, on Christmas Day, asking if it were the will of the people that William should be crowned king he spoke first of all in French.

But, you say, all this happened more than 800 years ago; how do you know what they said, and in what language?

Look again into that case in the British Museum, where we saw the actual message from the past, in the story of Bede, and in the Anglo-Saxon Chronicle. You will remember that the opened pages tell of the "Angel" boys at Rome, and a great victory over the Danes.

Next to the Chronicle comes a history of the Norman Conquest, in French, written by a man who knew many of those who had fought in the great battle. For many years authors wrote in French, because the king and his court and nearly all the richest people in England spoke French. There is an old poem written for the children of those times, in French, with English meanings below, just as in the French lessons in this book. The writer of long ago says that he has so arranged it in order that the children may understand what they are reading, and when to use *le* or *la*, *son* or *sa*, *mon* or *ma*. Even the accounts of what was done in the law courts and at the meetings of the Wise Men, who helped the king to govern the country, were all in French. But the use of the language spoken by Bede and Alfred did not die out, as some thought it would, any more than did the English nation, sorely oppressed as it was. By slow degrees the English and their language rose again; Normans married English wives, and naturally their children and grandchildren spoke both French and English.

Slowly the use of French as a separate language passed away, but the English language which we speak now contains many words brought over by the Normans.

Among other interesting traces left by the Norman conquerors are the strong square towers, or "keeps," to be seen not only by the banks of the Thames but at Norwich and Rochester and many other places. Most of them look strong enough now to stand a siege, and take us back to the days when the nobles shut themselves up in them, and sallied out to make prisoners and to steal and plunder. There was no redress for the unhappy neighbors. We have already looked at the beautiful little Norman chapel in the Tower of London, where the Conqueror and his family are believed to have attended service, and all over England and the south of Scotland we can find examples of the round arches and beautiful moldings which go toward making what is called the Norman style. Examples are shown you on the next page.

THE MONUMENTS AND PICTURES OF THE NORMAN TIMES

Some of the abbeys and cathedrals are still standing, having been repaired and added to through the centuries since the time of their founding; others are in ruins, without roofs, with grass and ivy showing up green against the gray stone. If we cross over to Normandy, we find many more of these buildings in the old home of the Normans: at Caen, where the Conqueror lies buried and whence stone came in barges up the Thames to build old St. Paul's; at Bayeux, where the famous tapestry is kept; at Rouen, the old capital of Normandy, and hundreds more.

As we look for these places on the south side of the Channel let us think of the amount of coming and going there was across this "arm" of the sea, which lay in the midst of the dominions of the dukes of Normandy, who were also kings of England. Barons and soldiers were constant travelers, for wars were unending then; traders, too, came and went; workmen and builders; fair ladies as brides, as well as the kings themselves, who had often to cross from side to side to look after their possessions. The pictures of the ships of those days, so beautifully painted by the monks in monasteries, suggest small comfort on board, and very little room.

THE KNIGHT WHOSE ARROW KILLED A KING, AND WHO FLED IN FRIGHT

There was a man who fled over the Channel from Southampton in the first year of the twelfth century who must have felt in desperate anxiety for his ship to move quickly. He was a knight who had been hunting in the New Forest with the Conqueror's son, William, called Rufus, or Red, on account of the color of his hair. Either by accident or not, the arrow he shot killed the king, and the knight was so frightened he rushed away to Normandy. You can see the stone set up in the beautiful forest, to mark the spot. But there was no mourning for the Red King; people were glad and thankful when he died, for he was cruel and selfish.

His brother, Henry I, was king after him. His nickname was Beauclerc, the French for "fine scholar." He began well by giving his people, three days after his brother's death, a letter in which he promised to set right the bad rule of his brother's time and to keep the laws of Edward and Alfred.

There are many of these letters, or charters, that we can see in the Manuscript Room of the British Museum, promises of all kinds about lands and government, made through many years of history. The earliest belong to Saxon times, and you can find on them many names that you already know, such as Edgar, who rowed on the Dee; Canute, the Danish king whose flattering courtiers asked him to command the waves of the sea to stop; Edward the Confessor, who built Westminster Abbey.

HENRY I, WHO HELPED THE POOR TO GET JUSTICE

Then you can pass on to those of William I and his two sons, granting land to various nobles and Churchmen, all with Norman names. Next comes a grant by Matilda, the daughter of Henry I, of land to the lovely abbey at Reading, where to this day the ruins, kept in fine order, can be visited by the thousands of people who live near and work in the great biscuit factories and in the seed nurseries of blazing colors that we can see as we travel past on the Great Western Railway.

Henry had pleased the English very much by marrying a princess who was the daughter of Queen Margaret of Scotland, belonging to the old royal family of Alfred and Edgar. They felt now that they had some share in their country, and took heart once more, and hoped for better days. Queen Maud was a good woman, like her mother, and she helped her husband in many ways. He put down the great and oppressive power of the nobles and destroyed many of their castles. He also helped the poor to get justice. Henry lost his only son, William, when he was eighteen. He was drowned, with a number of his young companions, while crossing the Channel.

THE WORK THE NORMANS LEFT BEHIND

The war-chest of William I, Minster Church.

Court of Fountains Abbey, Yorkshire.

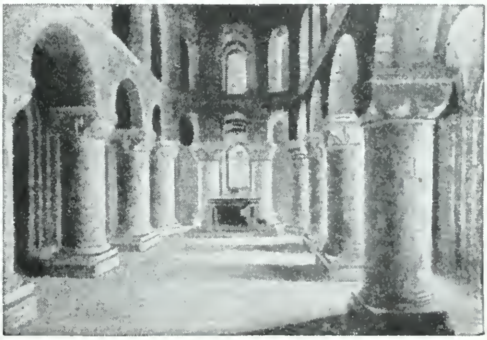
Patrixbourne doorway.

Transept of Ely.

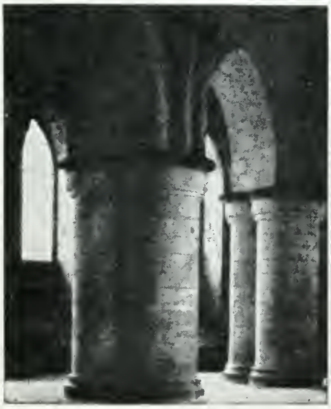
The gate at Kilpeck.

Prior's doorway, Ely.

The Norman staircase at Canterbury.



The old Norman Chapel at the Tower of London.



Columns of Canterbury.

Nave of Rochester Cathedral.

Interior of Worth Church, Kent.

The fine new White Ship, in which Henry had been persuaded to let his son travel, struck upon a rock, and only one of all the passengers managed to hold on to some wreckage till morning.

Henry never recovered from the great shock (it is said that he never smiled again), and though the nobles promised to take his daughter Matilda for their queen at his death, it was his nephew Stephen who succeeded him.

THE WAILING OF THE PEOPLE WHEN THE LAND BARE NO CORN

In Henry's reign the Anglo-Saxon or English Chronicle, begun by Alfred and continued year by year in different hands, came to an end, probably because of the disorder of those days. Matilda and Stephen disputed long for the crown. An old chronicle of the time gives an account of Matilda escaping from Oxford with her companions, over the Christmas snows, all dressed in white so as not to be seen. Fighting went on, and the barons began building castles again, and taking people's property from them and doing as they liked, till all the good that Henry had tried to do in the way of securing peace and quiet and justice was undone. "The land bare no corn," wails the historian. "You might as well try to till the sea as the land, for the wickedness that is done in it."

The king of Scotland was Matilda's uncle, so he was glad of an excuse to make war on Stephen; and there was a famous battle fought in Yorkshire, called the Battle of the Standard, on account of the banners of three great churches of Yorkshire being taken into the fight. The victory was not of much use to Stephen, for the king of Scotland kept Cumberland without owning Stephen as his overlord.

THE POPE OF ROME GAVE IRELAND TO THE ENGLISH KING

When Stephen died, Matilda's son became King Henry II. His wife Eleanor was a French princess. She was heiress of three splendid provinces in France, and Henry was in his own right duke of Normandy and overlord of Brittany, so that his dominions reached from the north of England to the Pyrenees, the great mountains which separate France and Spain. Much as he had, he was always going to war and planning to get more; especially he wanted to be king over the whole of the British Isles. After restoring order in England by destroying castles and re-establishing the power of the courts of justice, he made the Scotch king give up Northumberland, Cumberland and Westmorland, all south of the Cheviot Hills. He tried to get Wales and Ireland, but without much success. The only Englishman that was ever pope lived at this time, and he made Henry a present of Ireland, because it was said then that all islands belonged to the pope, and that he had the right to do what he liked with them.

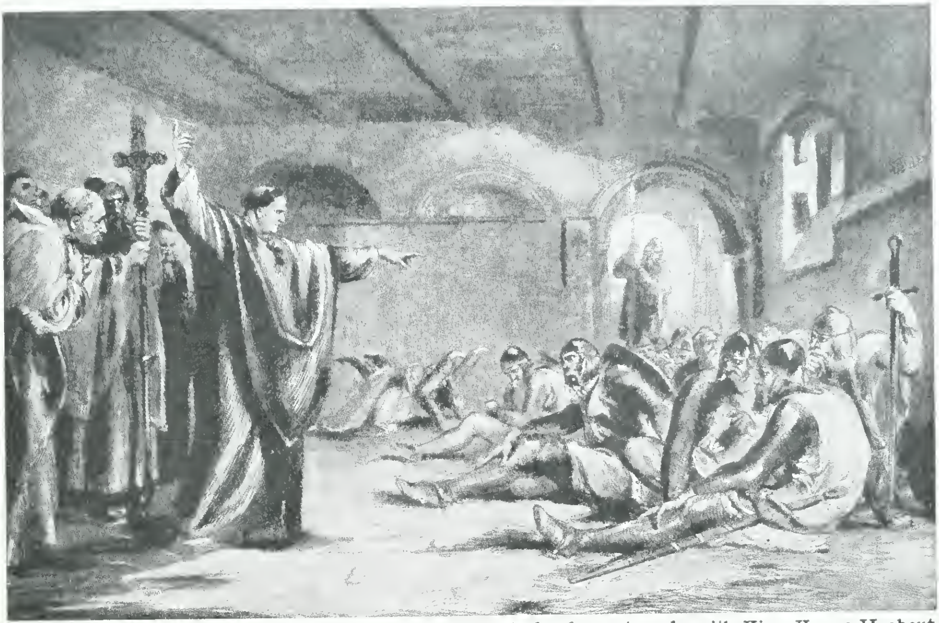
Naturally the Irish did not agree to this. They preferred their own ways, with wild chiefs always struggling and fighting together; and though Henry succeeded in getting some sort of order in the part of Ireland that was nearest to England, which was afterward called the English Pale, things were as bad again, or worse, as soon as he was gone. A French king said of him, with amazement: "The king of England is now in Ireland, now in England, now in Normandy. He may be rather said to fly than to go by horse or boat!"

THE TERRIBLE THING THAT HAPPENED IN CANTERBURY CATHEDRAL

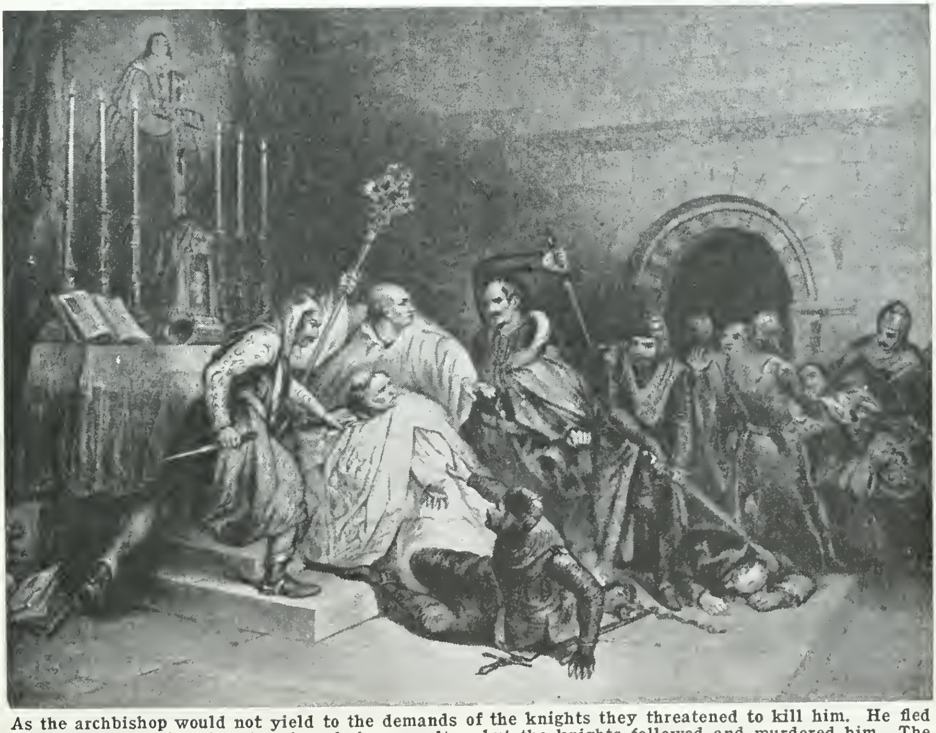
If you go to Canterbury Cathedral you will see the spot where the great archbishop of Henry's time met his death. His name was Thomas à Becket. Once a great favorite of Henry's, he had disagreed with the king about some Church affairs, chiefly about how the clergy were to be punished when they did wrong. Henry, in a passion one day, said he wished someone would rid him of the troublesome archbishop. So four men hastened over from Normandy, where King Henry then was, and, taking the king at his word, killed Thomas in his cathedral. The steps that lead to the spot where the archbishop was buried are worn by the knees of pilgrims who for long years went to pray at the tomb of the man who had suffered for defending the clergy against the king.

Henry was not forgiven till he had walked barefooted and bareheaded to the chapel and received a beating with rods from each of the monks in turn. Before he died he portioned out his great dominions to his sons; but they did not like his keeping the overlordship in his own hands, and there were miserable family quarrels in consequence. When

THE ARCHBISHOP WHO DEFIED THE KING



Thomas à Becket, the great Archbishop of Canterbury, had a long struggle with King Henry II about certain rights of the clergy. The king, who was in Normandy at the time, at last flew into a passion, and said he wished someone would rid him of the archbishop. Four knights at once hastened to Canterbury, and in this picture we see them arguing with Thomas à Becket in his church palace.



As the archbishop would not yield to the demands of the knights they threatened to kill him. He fled into the Cathedral and took refuge before an altar, but the knights followed and murdered him. The steps that lead to the spot where the archbishop was buried are worn by the knees of praying pilgrims.

the name of his favorite son John was found on the list of those fighting against him, the old man could bear no more. Turning his face to the wall, he said bitterly, "Let things now go as they will. I care no more for myself or for the world."

His son Richard I then became king. Look at the statue of him set up in front of the House of Lords at Westminster. It is a fine figure on the great strong horse, clothed in armor made of little rings of metal, and holding aloft the long spear he used against enemies far away from England. During the ten years of his reign he was nearly always away, and his wife was the only queen of England who never entered the country.

The great barons took advantage of Richard's absence to break out again, and the people suffered much from bad trade and bad cultivation of the fields, and from having nearly all the money they had squeezed out of them. Perhaps you are wondering who had the money, and what for?

RICHARD THE CRUSADER, AND HOW HE GOT MONEY FOR HIS WARS

Of all things Richard loved fighting and adventure best, and in his time the most exciting adventures were to be had in the Holy Land, at the eastern end of the Mediterranean Sea. The country, and its capital, the scene of our Lord's life on earth, had fallen into the hands of men who did not believe in Him, and who treated very badly the Christians who went to pray at the spots that were so sacred to them. So the Christians of Europe—French, English and others—spurred on by the pope, determined to get up expeditions and do their best to get the Holy Land away from those men. Richard I joined the third of these expeditions, and he needed a great deal of money to pay for the journey.

He even sold a treaty which had been gained by his father from the Scotch king, William the Lion, in which he had acknowledged Henry as his overlord for the whole of Scotland. But Richard did not care; when once the fever and excitement of the Crusades, as these "holy" wars were called, were upon men, they seized what money and arms they could lay hands on, sewed strips of cloth like a cross on their arm, and hurried off by sea and by land to gain renown in fighting the enemies of Christ. We read the story of these Crusades in the Book of Men and Women, beginning on page 2583 of our book.

So money was squeezed out of everybody—barons, people and even the clergy—to pay for Richard's "holy" wars, and to get him out of prison when he fell into the hands of enemies.

RICHARD FORGIVES HIS ENEMY ON HIS DEATHBED, AND JOHN BECOMES KING

Round the base of Richard's statue, opposite the House of Lords, are shown the scenes of his death at the siege of a castle in France. On one side is the terrible fight going on; on the other the king lies on his bed, pardoning the man whose arrow caused the wound from which he is dying.

Richard's brother John was the next king of England. It is difficult to say anything good about him. He seems to have been cruel to everybody and to have had no friends. When the barons would no longer serve him, he wrung money out of his other subjects and hired foreign soldiers to fight for him in Scotland, Wales and Ireland. He had not been king very long when he lost not only Normandy, so that the English kings were no longer dukes of Normandy, but the other parts of France that had belonged to his mother, who was the divorced wife of the king of France.

One of the most violent quarrels John had was with the pope, who exercised, as the pope did then, the right of ruling the churches of all the Christian countries, such as France, Spain, Germany, England, and they were very angry if any appointments were made without their leave.

WHEN THE CHURCHES WERE CLOSED AND NO BELLS WERE RUNG IN ENGLAND

So when John refused to accept an archbishop of Canterbury chosen by the pope, the pope sent an order that, till the king gave way, all churches were to be closed; no bells were to be rung calling the people to service; no one was to be baptized, married or even buried by the clergy. This made everyone very wretched, especially the poor, for they were used to getting help and comfort from the monasteries and clergy. This order from the pope was called an *interdict*, or forbidding. It seemed as if a blight were on the land while it lasted, and John only got more and more angry and violent. The pope made a present of John's throne and kingdom to the king of France; then suddenly John changed his mind, received the archbishop, and restored what he had taken from the Church.

THE GREAT SHAME THAT JOHN BROUGHT UPON THE NATION

And now, see what a humiliation John inflicted on the proud, independent spirit of the nation. To show his submission to the pope, he took off his crown and handed it to the pope's messenger, receiving it back again as a gift from the pope. John's letters about this time are dated from Dover, which reminds us of the story of his riding from place to place, from Windsor to the ports between Sandwich and Rye, and then crossing to the Isle of Wight, anxiously looking for the help from abroad which never came.

In the British Museum hangs a copy of the Great Charter, often called by its Latin name, Magna Carta. Look at it well. It was forced from John, with great courage and difficulty, by the barons. In it he had promised certain rights to the people, so that they might live in safety under good government. This Great Charter, which is often called the foundation-stone on which liberty was built, was drawn up from the charter which Henry I gave to the people when he became king, which, again, was established upon the laws of Edward the Confessor and Alfred. Four hundred years later a charter called the Petition of Right, based on Magna Carta, was presented to King Charles I for signature.

THE GREAT CHARTER THAT JOHN SIGNED IN A TEMPER

You would like to hear what sort of promises are made in that cramped Latin writing. Among them are these:

1. The king was not to make the people pay taxes without the consent of the Great Council.
2. No one was to be punished for any wrong-doing without a proper trial according to the law of the land.

There is a little island on the Thames, near Windsor, called Magna Carta Island, and on it John met the barons to put his seal on a lump of wax to show that he "signed" and consented to keep the promises set out in the Charter. He was in a furious state of anger all the time. It is said that as soon as the deed was done "he threw himself on the ground, gnashing his teeth and gnawing sticks and straws in his rage."

The pope supported John and freed him from his promise, and crowds of foreign soldiers came to help John to burn and rob and kill all over the country. It was a troublous time. Louis of France evidently felt he was going to take John's place—you can see amongst the charters a grant from him, giving away the town of Grimsby. Then the end came suddenly.

John had to cross the Wash, that broad inlet between Lincolnshire and Norfolk. When the tide is out, there are miles of sands, and the long train of carts and wagons which were carrying the king's treasures were lost in soft quicksands as the tide came flowing in. Quite lately a handsome cup was washed up near the shore of the Wash, and it is believed to be part of this lost treasure of King John.

The grief and worry of it all caused John's death. The whole account of it can be read in the open page of The History of Matthew Paris, beside the chronicle which describes the extraordinary efforts made to ransom his brother Richard from captivity.

HENRY III, THE KING WHO BUILT WESTMINSTER ABBEY

John's little son Henry, only nine years old, was soon crowned at the Abbey—the old Norman abbey of the Confessor. In one of the illuminated manuscripts in the museum, gleaming with illustrations in bright colors and thickly-laid-on gold paint, there is a picture of Henry III holding a model of the Abbey in his hand. The reason for his being so shown is that one of the great works of this king's long reign of more than fifty years was the beginning of the rebuilding of this church. He pulled down the old Norman east end and built it up again in the new style that had come in, with arches pointed instead of round, and with much higher walls, columns and roofs.

We can still go and look at this beautiful work of more than six centuries ago. Only part of the splendid tomb Henry set up in it for the body of Edward the Confessor now remains. The golden shrine and golden statues and precious stones are all gone. You may think it looks dusty and dingy now, as you look close into it to see the mosaic or inlaid pattern of tiny pieces of glass; but remember that it has stood there for hundreds of years, and that round it have passed not only generations after generations of quiet folk come to pray in the holy place or to admire its beauties and read the story of the past, but also rough soldiers and thieves, who tore down the ornaments and jewels and made sad havoc with what had been the pride and joy of their forefathers.

SIMON DE MONTFORT, THE PEOPLE'S LEADER AGAINST THE KING

It has been said that the great result of Henry's long reign was the giving back of England to the English. It was possible for a poet who lived toward the end of this reign to sing:

> Now England breathes in the hope of liberty.
> The English were despised, but now they have
> lifted up their head.

You will remember that William the Conqueror claimed all the land as his own, and parceled it out as he pleased, and also that when he wanted money he forced the people to pay as much as he chose. Now, two centuries later, when Henry III wanted money for his wars, his buildings and his foreign favorites, the people were strong enough to refuse to give it to him unless he promised to keep to the Great Charter and rule by the law of the land. In the great fight between Henry and the people about this, the name of a great patriot stands out—Simon de Montfort.

"I fear thunder and lightning not a little, Sir Simon," said Henry to him one day when caught in a bad storm, "but I fear you more than all the thunder and lightning in the world."

HOW THE BISHOPS FLUNG DOWN THEIR CANDLES AT THE KING'S FEET

Before the actual fighting began, Henry made promises over and over again, only to be broken. Let us see and hear how these promises were made on one occasion. A great procession of bishops and clergy, with splendid silk robes, carrying lighted candles in their hands, arrived at the Great Hall at Westminster, where Henry awaited them. Then, standing round him, they spoke strong and terrible words as to what would happen to the king who took away any of the freedom of the land. As their voices died away—can you almost feel the hush after the loud, passionate talking?—they flung down the lighted candles, saying: "May all those who take away our rights perish, as these lights perish!"

The king made solemn promises as the candles were relit, and the bells rang out joyfully to tell the news to the people outside.

But the promises were broken, and the country had to fight again, and Henry was forced to draw up new laws and add to the good old ones. The new laws were written in English for the first time since the Norman Conquest. Again the king broke his word, and more fighting went on, till at last Simon succeeded in forming a "talking place," called a Parliament, after the French word *parler,* meaning "to talk."

This was even more useful than the old Assembly of the Wise Men had been. In it not only barons and bishops could discuss what was best for the country and the people, but knights from every shire had the right to come and talk; also citizens from the towns, and these, too, had a voice to say what the people in their part of the country wanted done, and how they wished the money to be spent which they paid in taxes. Although the name was not used until 1295, this meeting was really the first model of the English Parliament of to-day.

THE CHILDREN'S ENCYCLOPÆDIA OF HUNDREDS OF YEARS AGO

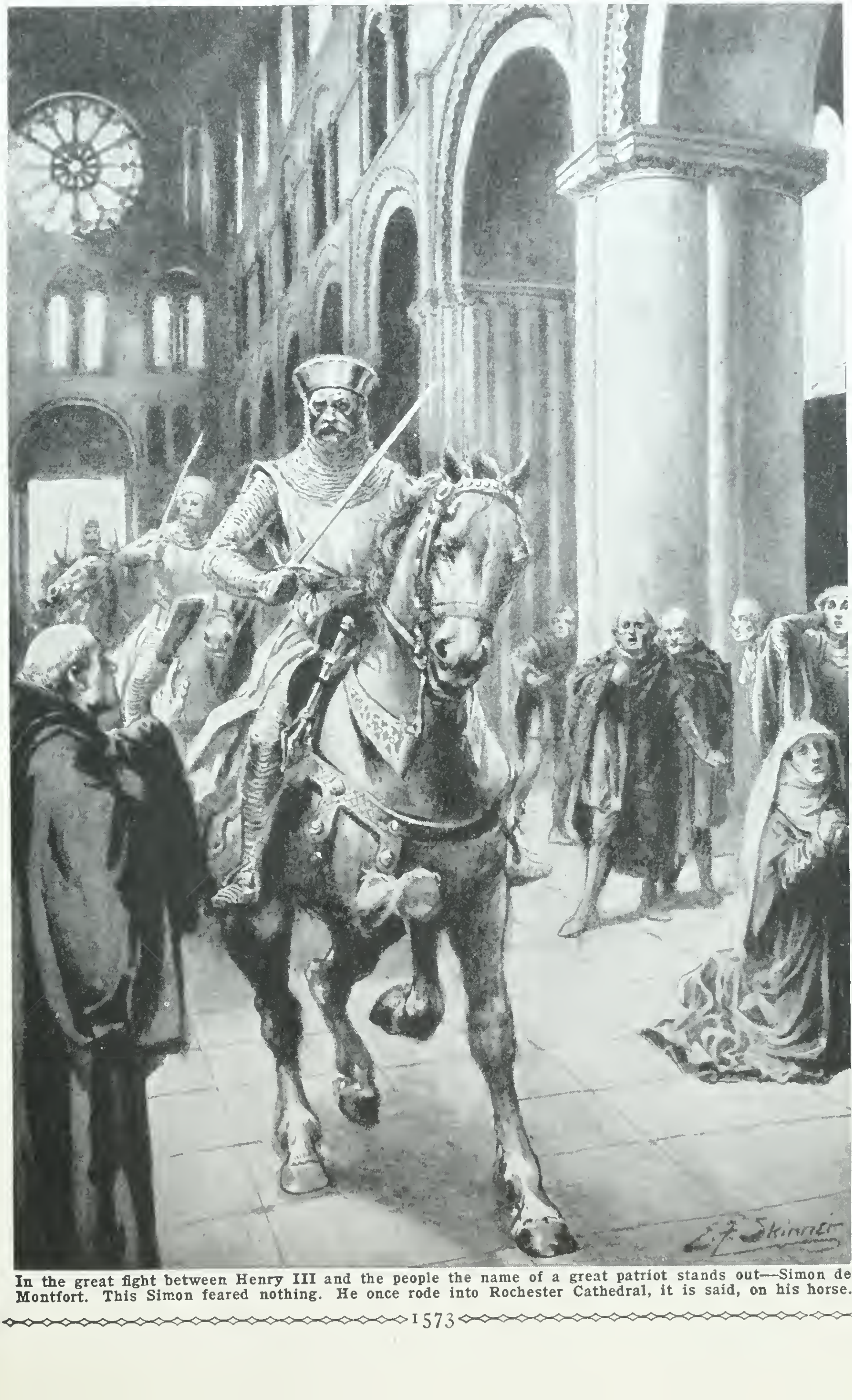
The battle of Lewes was the crowning victory of the barons under Simon. When Henry was taken prisoner at its close, did he think, one wonders, of the words he had said long before about fearing his conqueror?

Three years after this battle a great thinker named Roger Bacon wrote a book about every sort of knowledge, which has been called the encyclopædia of the thirteenth century. He speaks of geography, grammar, music, languages, arithmetic and many other matters. The story of how hard he worked, how he collected his materials, how poor he was, how kind he was in teaching others as poor as himself, is of great interest.

Henry's son Edward helped him at the battle of Lewes; later he went to join in a crusade, for these wars were still lingering on. While in the Holy Land he came near to losing his life.

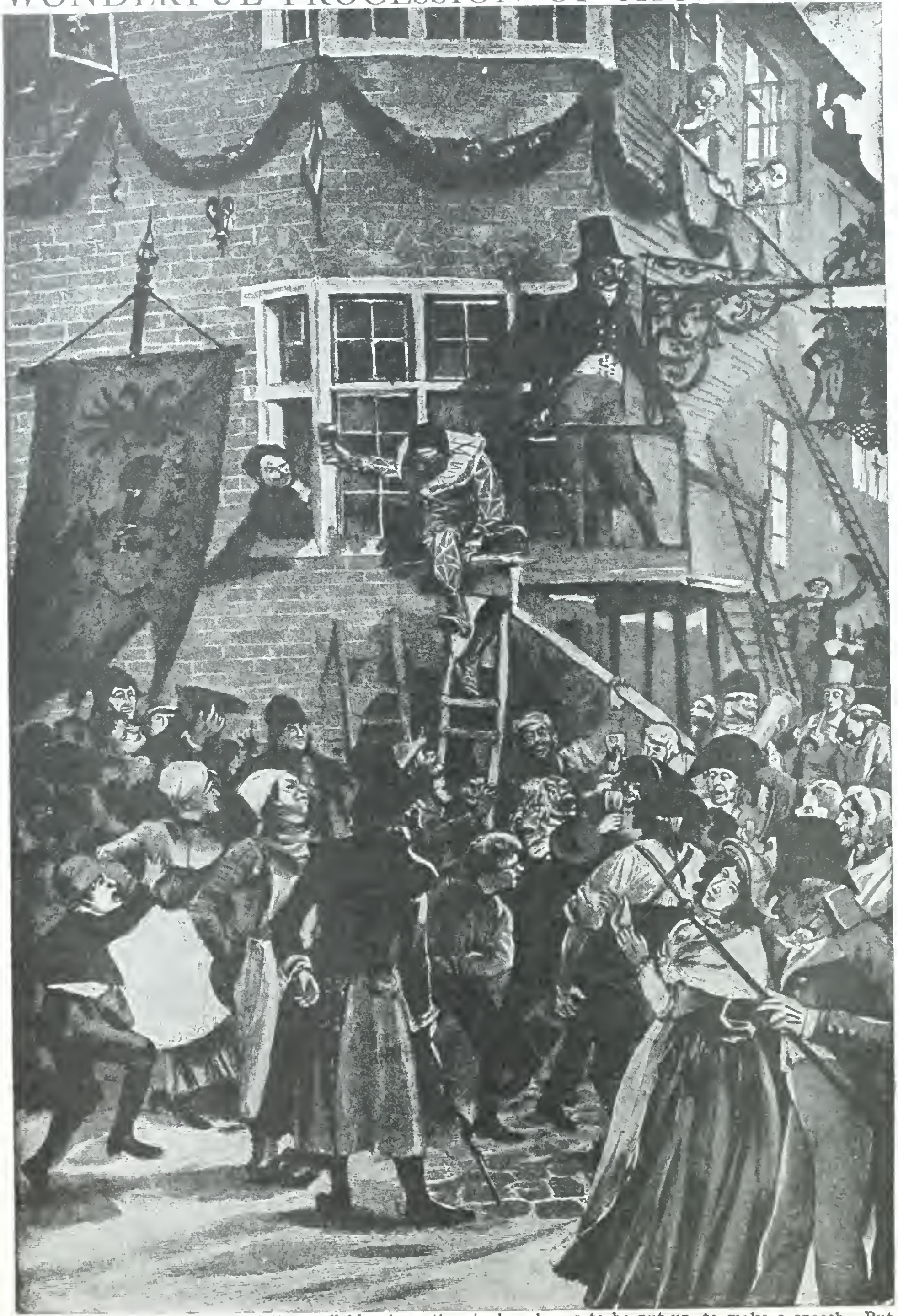
THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 1679.

SIMON DE MONTFORT COMES TO ROCHESTER

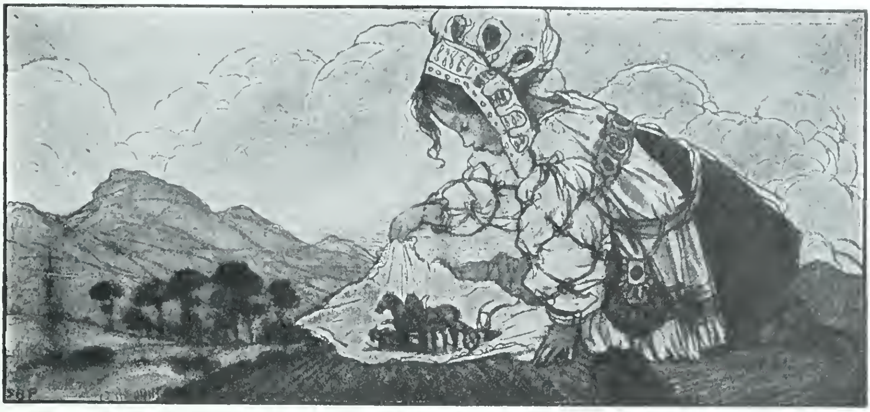


In the great fight between Henry III and the people the name of a great patriot stands out—Simon de Montfort. This Simon feared nothing. He once rode into Rochester Cathedral, it is said, on his horse.

WONDERFUL PROCESSION OF SHOEMAKERS



The chief shoemaker mounted the scaffold, where the signboard was to be put up, to make a speech. But the clown jumped up, and the people roared at his grimaces. Then the Wind joined in the fun and rattled signboards in the street, and the speaker got down, saying: "It is no use trying to talk in this wind."



THE GIANT'S PLAYTHING

LONG ago giants lived among the German mountains. Now, there was a great castle, called Burg Niedeck, that stood on top of the highest mountain in Alsace, and here the most powerful of the giants lived with his wife and family. He had one child, a girl named Freda.

Freda was as tall as a church steeple. She was a curious child, and very fond of prying about and looking at things which she had been told to leave alone. She was allowed to roam all about the mountains and to play in the woods and forest, but she was not allowed to go down into the valley where the little people lived.

These little peasants tilled the ground, and planted corn and wheat and barley, and grew the vines, and dug the ditches—things the giants could not do. And the giants lived by taking what the little people made.

Now, it was said that the first time a peasant found his way up into Burg Niedeck it would be the end of the giants. But Burg Niedeck was very difficult to reach, and no peasant had ever thought of trying to get there.

One day Freda was playing outside the castle gates. The valley looked so cool and green and shady that she slipped down the mountainside to find out what was below.

Presently she saw a peasant plowing. He had two horses, and the iron of the plow shone and glittered. With a cry of joy Freda knelt down.

"What a dear little thing! I will take it home to play with." Spreading out her handkerchief, she carefully lifted the plow and the horses and the poor peasant into the middle; then, taking the corners in her hand, she ran up the mountainside, skipping and jumping for pleasure. Her father met her at the gate.

"What is pleasing you so?" he asked.

"Look," said Freda, spreading out her handkerchief, "I have found a most wonderful new toy." And she lifted out the plow and the peasant.

But the old giant frowned and shook his head angrily.

"What have you done, thoughtless one?" he said. "The peasant is no toy. Have you not heard that as soon as a peasant comes to Burg Niedeck there will be an end of the giants forever? Take it back instantly to the valley, and perhaps the spell will not break."

Sadly Freda took the plow and the horses and the peasant back, and set them in the cornfield. But it was too late. That night all the giants disappeared, and in the morning the castle of Burg Niedeck stood in ruins. And no giant has been seen there since.

THE WIND SINGS DOWN THE CHIMNEY

HANS ANDERSEN'S TALE OF THE SIGNBOARDS

THE Wind is a merry creature. Have you seen him sweeping across a field and making the wheat ripple like the waves of the sea? That is the Wind's dance. And the Wind not only dances but he sings. Listen to him singing down the chimney now.

"Shoo! shoo! sh-sh-sh!" the Wind is saying. "If there were no old gentlemen wearing tall hats that I could send spinning down the road, I should be tired of town life. All the excitement and fun have gone from it. A hundred years ago there was nothing I liked better than a good blow down this street. It was more like a picture-show than a place of business. Every house was hung with signboards. There was the tailor's board with figures painted on it to show that he could turn the shabbiest rascal into a fashionable gentleman; the barber had a long pole with a wooden razor hanging from it; fishes, loaves, hats, cheeses—all the things, in fact, that were sold in the town—were painted on signboards, and when I made them swing and clatter, the noise was deafening. What a merry time I had one night among the signboards! What was it set me on that piece of mischief?"

The Wind grew silent for a few minutes, and then gave a jolly roar that made the house rock. "Oh, I recollect it all!" he shouted down the chimney. "It was the day when the shoemakers removed from their old guildhall into their new building, and brought their signboards with them. Rich and powerful were the shoemakers in those old days, and their procession was a sight worth seeing.

"They had a clown to clear the way—a comical figure with a black face and clothes made out of a patchwork of colors. How the crowd laughed as he struck right and left with his great bladder! I don't see such frolic nowadays. Behind the clown came the musicians; they were followed by the banner-bearers with the great silk banner of the shoemakers, adorned with a large black boot and a two-headed eagle.

"Mounting the scaffold where the signboard was to be put up, the chief shoemaker began to make a speech. But the clown jumped up beside him, and the people roared at his grimaces. Joining in the fun, I rattled every signboard, and the speaker got down, saying: 'It is no use trying to talk in this wind. Let us put up the signboard.'

"But I was resolved," chuckled the Wind, "that the signboard should not be put up. I blew the shoemakers' aprons over their eyes; I upset their ladders; I carried away their wigs and hats. At last they gave up struggling and went to feast in their new hall.

"I was bent on mischief. Having got the best of the shoemakers, I thundered up and down the streets, trying to think of some new prank. I began unroofing old houses, and the air was filled with falling tiles. In the night a wilder piece of mischief-making occurred to me.

"I got among the signboards and rearranged them. Though I say it myself, the work was performed with wit and skill. When the townspeople woke up the next morning, they found that the inscription 'The Institute for High Education' had been blown on to the billiard club. The Institute got in exchange a signboard taken from the day-nursery: 'Children Reared by the Bottle.' A good-natured furrier had a fox painted on his signboard. This I carried across the street, and put it on a house occupied by a hard, cunning councilor, who pretended to be a saintly person. That made the townspeople laugh; and so did the sign which I stuck in the railings of the judge's residence. It was the barber's pole with the wooden razor. 'The razor' was the nickname that the judge's wife had earned through her cutting tongue.

"But the best joke of all," whispered the Wind, "was the trick I played on the scandal-monger of the town—a rich old woman who was always listening for tales against her neighbors. I stuck over her door a notice torn from a building site: 'Rubbish may be shot here.'

"They were merry days," sighed the Wind, "but they never put the signboards up again after I got among them. They pretended it was dangerous, but the fact was that I made some of the people so ashamed of themselves that they did not like to be reminded of my merry trick."

With that the Wind ceased to talk down the chimney, and with a whistle blew away out into the open country.

THE KING WHO COULD NOT SLEEP

THERE was a fierce and warlike young king who seemed to possess everything that the heart of man could wish. He was very rich and very powerful, and he had a great army, which he led from victory to victory. But, in spite of all his wealth and might, he was the unhappiest man in his kingdom; his restless mind was so full of ambitious schemes that he could not sleep.

He summoned to his court the most famous doctors in the world, but none of them was able to cure him of his malady, and at last he made a proclamation that he would give half of his kingdom to any person who could make him sleep in a calm and natural manner, but anyone who tried and failed would be imprisoned.

One evening a pretty shepherdess came to his palace and said that she could heal him. In spite of the anguish he was in, the king looked at her with pitying eyes.

"Return home, my pretty child," he said. "You cannot possibly succeed where all the wisest doctors have failed."

"No! I cannot go away," said the little shepherdess, "until I have done my work—until I have tried to save you."

"Well, before you try," said the king, "tell me what your remedy is. Some simple thing that your mother taught you, no doubt."

"Yes," she replied. "It is something my mother taught me. Here it is."

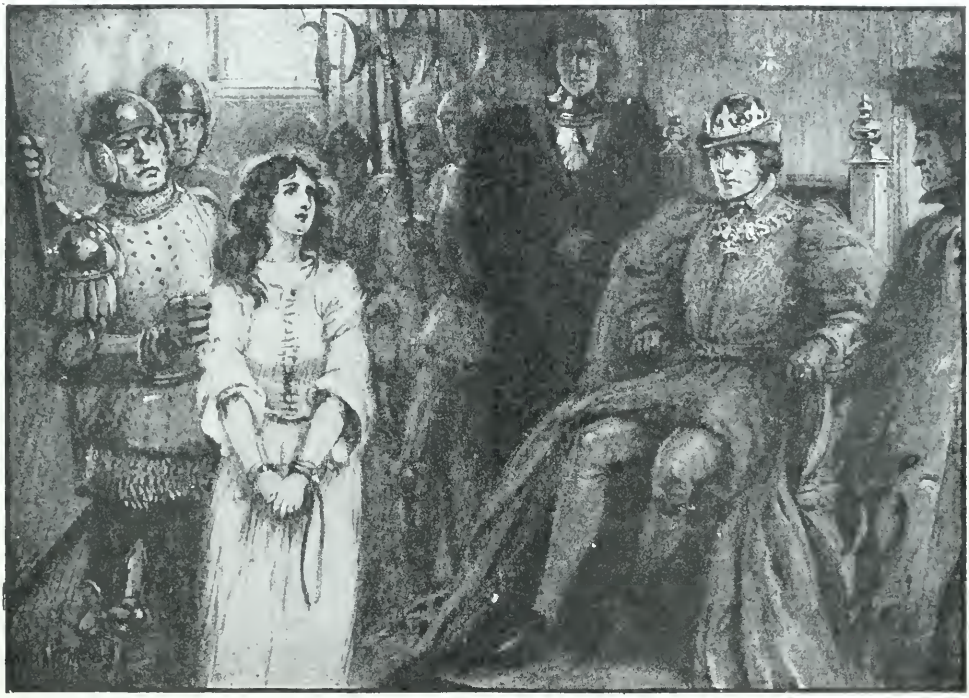
And leading the king to an open window, she pointed up to heaven.

"What! You have come to mock me?" said the king.

"No!" said the little shepherdess. "I have come to teach you to pray."

But the king still thought she was mocking him, and growing harsh with anger, he called in his soldiers and ordered them to put the girl in a dark dungeon. Sitting in a chair, he watched in a fierce mood the warders bind the shepherdess in fetters. But his heart was touched when he saw the sweet and innocent child walking to the dungeon with a smile upon her bright and lovely face. He followed her, and saw her kneel down and pray.

"Kind and loving Father," she said, "teach him to pray to Thee with a humble heart for forgiveness for his sins, so that he may lie down at night with peace and happiness in his soul."



HIS HEART WAS TOUCHED WHEN HE SAW THE INNOCENT CHILD WALKING TO THE DUNGEON

Then she remained with her head bowed in silent prayer, and the king sprang to the door of the dungeon and cried to the warders: "Unbind her! Set her free at once!"

The king then returned to his room, and knelt down by the side of his bed, and clasped his hands, as he had seen the shepherdess do in the dungeon. No words, however, came from his lips, for he had forgotten the prayers which his mother had taught him. But he must have prayed inwardly, for when he lay down he fell asleep, and he woke up the next morning a changed and better man. He no longer thought of war and wealth and power, but considered how he could make his people happy.

"Oh, if only I had my little shepherdess to help me!" he exclaimed.

He at once sent his messengers out to find the little girl, but none of them was able to discover where she was. The king was greatly disappointed; but having learned to pray, he was able to sleep, and he soon recovered the strength and beauty of his youth. Under his mild and skillful rule his people became happy, and one day a beautiful young lady entered his palace, and said to him, with a winning smile: "Have you forgotten me? I am the little shepherdess."

"I knew you at once, beautiful one," said he. "I have been longing for you these many days to make you my queen. You saved my life and can help me make my people happy. They will love you."

"That would be my greatest joy, O King," she replied. "But you will let my mother live in the palace with me, won't you? It was she who taught me how to cure you, by saying to me every night: 'Don't forget to say your prayers, my child, if you wish to sleep in peace and have happy and pleasant dreams.'"

Then the little shepherdess and the great king were married, and there was much rejoicing through the land.

THE LOVE THAT WAS WORTH NOTHING

KING FRANCIS of Germany sat one day in his lion garden waiting for the animals to come in and fight. All round him were the nobles and ladies of his court.

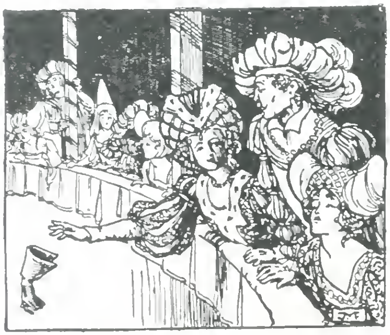
The king nodded his head. A gateway opened below, and a great tawny lion sprang into the ring. Looking around, and lashing its tail, it laid itself down in the centre.

The king nodded again. A second gateway was opened, and a magnificent tiger appeared, and roared when it saw the lion. After prowling hungrily round the ring for a while it laid itself down, a little way from the lion.

Again the king nodded. Two leopards rushed out and sprang upon the tiger, who knocked them away with one pat of its great paw. For a while the whole air was filled with their roaring. Then it died away as the leopards slunk off to a far corner of the ring, awaiting a better chance of springing upon the tiger.

As the nobles held their breath waiting for the fighting, suddenly a little glove fell from one of the balconies, right between the lion and the tiger. A noble's beautiful daughter turned to the knight beside her.

"Now, Sir Knight," she said laughingly, "if your love is as strong as you are forever telling me it is, bring me back my glove which is in the ring below."



Suddenly a little glove fell.

The knight looked at her. Then, almost before anyone knew what had happened, he sprang from the balcony, and quick as lightning had the glove in his hands. The animals sprang to their feet, but they were too late.

A cheer went up, and everyone crowded round to praise him and to see him present the lady with her glove. She could not refuse to give herself to him in marriage, they thought, after he had done such a brave deed for her.

The knight bowed very low.

"If for your pleasure you can expose me to such unnecessary danger," he said, "I neither value your love nor want it."

And he threw the glove straight in her face, and left her presence forever.

STORIES FROM THE CHINESE

It is the ambition of every family in China to have at least one boy who shall distinguish himself in the examinations through which their public officials are chosen, and Chinese storybooks are full of interesting tales of the cleverness and perseverance of studious boys.

THE BIG JAR OF WATER

A LITTLE boy named Kwang, who was very clever because he always paid attention to his lessons and tried to understand everything that came in his way, was playing with some other children when one of them fell into a large earthenware jar full of water. The vessel was a tall one, and none of the children could reach their comrade, who would certainly have been drowned had it not been for the wisdom of Kwang. He knew that anyone trying to save the boy through the mouth of the jar would not only be unsuccessful, but would probably himself fall in and be drowned. So Kwang took up a large stone lying on the ground, and throwing it at the earthenware jar with all his might, broke the vessel. The water at once ran out, and the little boy was saved.

THE BALL IN THE HOLLOW POST

IN a little village lived a boy named Yenfoh, who was very bright and clever, and always knew what to do in difficult circumstances. One day while he was playing at ball with some companions the ball struck the top of a hollow post and then fell to the bottom inside, quite out of reach of the children. All of them, with the exception of Yenfoh, thought the ball was lost. But he knew what to do. He ran to the village well and drew a pail of water. Then, bringing this to the hollow post while the other children looked on in wonder, Yenfoh poured the water in, and the ball floated to the top, where it could be reached.

THE BOY WHO FOUND LIGHT

IN the country parts of China the people are very poor—so poor that they are unable to have a light after dark, and simply have to go to bed. A boy named Kang, who was studying for the examinations, found that if he was to succeed he could not waste all the hours of darkness. His family, however, were too poor to buy oil, so what was he to do? A heavy fall of snow had taken place, and Kang suddenly remembered that white reflects light; so going out and sitting upon the cold ground, he held his book so that the light from the snow shone upon the page. This he did all through the winter. But at last summer came, and at the same time the snow went. What could poor Kang do now? He remembered that glow-worms give a tiny light, and so he collected a large number of these little creatures, and by the light which they gave was able to continue his studies far into the night. Kang became a mandarin of high rank.

THE BOY WHO HAD NO PAPER

A LITTLE boy who had the misfortune to lose his father when he was only four years old wanted to study for the examinations; but his mother lived in great poverty, and was quite unable to buy paper or pen and ink for him. The little boy, whose name was Yang-su, was greatly distressed at this, and for some time did not know what to do. He certainly could not study if he was unable to write, and how could he write if he had no paper? But it was soon proved in the case of Yang-su that where there is a will there is a way. The boy lived near the seashore, and going down to the beach, he took with him a branch of a tree, and with it wrote down words and worked out his problems upon the sand.

THE SLEEPY STUDENT

IN the province of Tsu lived a boy who was very anxious to distinguish himself in the examinations and thus to bring honor to his parents and his native village. But he found that after he had been studying for some hours he began to get very drowsy, and his head would nod until finally he fell asleep. This distressed him very much, and for some time he did not know what to do to keep awake. At last he thought of a way of doing this. He tied a cord to the end of his pigtail, and then fastened this to a beam in the roof, so that when he slept and his head began to nod, the pull of the pigtail at once roused him up again.

THE WEB OF CLOTH

MENCIUS was only three years old when he lost his father, but his mother worked very hard so that her son might have a good education. She sent him to school, and at first Mencius liked going; but he soon slackened in his studies, left the school and went home. His mother was weaving a piece of cloth into which she had put a great deal of hard work, and it would, when finished, be worth a large sum of money. As soon as she saw Mencius walk into the house, she took up a knife and cut the web of cloth, utterly spoiling it.

"My son," she said, "you are not half so sorry to see me cut this web of cloth as I am to see you leaving your studies."

Mencius was so moved by this action of his mother that he went back to school at once and always studied very hard.

THE HOLE IN THE WALL

A POOR boy named Kwang Hung was very fond of books, and loved to study; but his poverty prevented him from being able to purchase oil for his lamp, and he had no light. He worked for a magistrate, who at Kwang Hung's own request paid him in books instead of money, and no one was ever more delighted with his wages. Yet the books were of little use to the boy, for he was too poor to buy oil for a lamp at night.

At last he thought of an idea. His next-door neighbor had lights, and so Kwang Hung made a little hole in the wall, and by moving his book backward and forward in front of the hole he caught the light that came through the hole, and was able to go on with his studies.

When the examinations were held he went up with others, and so distinguished himself that his case was brought before the emperor, who gave him a high appointment, and finally Kwang Hung became prime minister of the Chinese Empire.

THE ROSY APPLE

IT was a cold winter afternoon, and snow covered the whole town in a mantle of white. The great cathedral clock tolled five, and a little ragged urchin, cowering in the shelter of the door, gazed up at the big tower and wondered what the bell must look like. But the cold wind blew so cruelly among his rags that he shrank back into the doorway again, glad of any shelter from the biting cold.

At this moment the great doors were thrown open, and Hans, who was a little German boy, and lived in Strassburg, knew that men and women would now come to the church to pray.

He had often peeped in wonder through the doors, and had seen in the distance the pretty glittering candles, the beautiful figure of the Mother of Jesus, and the white-robed priests kneeling at the altar.

Then, too, he had heard the organ and the voices of the choir, and they never failed to fill him with a great wonderment and a longing to learn more about it all. If only his clothes had been a little less torn he would have dared to venture in, for he had often seen poor people enter the cathedral; but, alas! he was clothed in rags, and he had not even a cap on his head or boots on his feet.

So he stood in the corner by the door, and watched the people pass in, as he had often done before.

Many of the ladies had long fur coats, and nearly all the men had big, warm collars and mufflers. Hans wondered what it would be like to have thick clothes, and not to feel a little bit cold or hungry. Poor little chap, he could not imagine that, for his limbs ached with cold, and he had scarcely eaten for two days. As he was watching the crowd a beautiful carriage drew up, and Hans saw a little girl, who was seated in it, look at him and then turn and speak to a lady who was with her. The lady handed her something from a basket, and then the coachman opened the door and they both stepped out.

Oh, how beautiful they were, and especially the dear little girl! Poor Hans opened his eyes in astonishment, and almost thought that she must be a fairy. Her coat was of pretty white fur, and she had a little cap and muff of the same material. Around her face fell golden curls, and on her little feet and legs she wore white boots and gaiters.

As they came up the steps Hans saw that in her hands she carried a big, rosy apple; but when they reached the top he could hardly believe what he saw, for the little maid ran up to him, and holding it out, said: "Here, little boy, would you like this apple?" And then, before he had time to speak, she ran after the lady, and he was left standing with the apple in his hands!

He was so astonished that he sprang forward and gazed after the two as they went into the cathedral, and there he saw the little girl kneel down by the side of her mother, as the priests began to pray.

For a long time he stood there, and once more longed with all his little heart to go in and kneel, as he saw others doing.

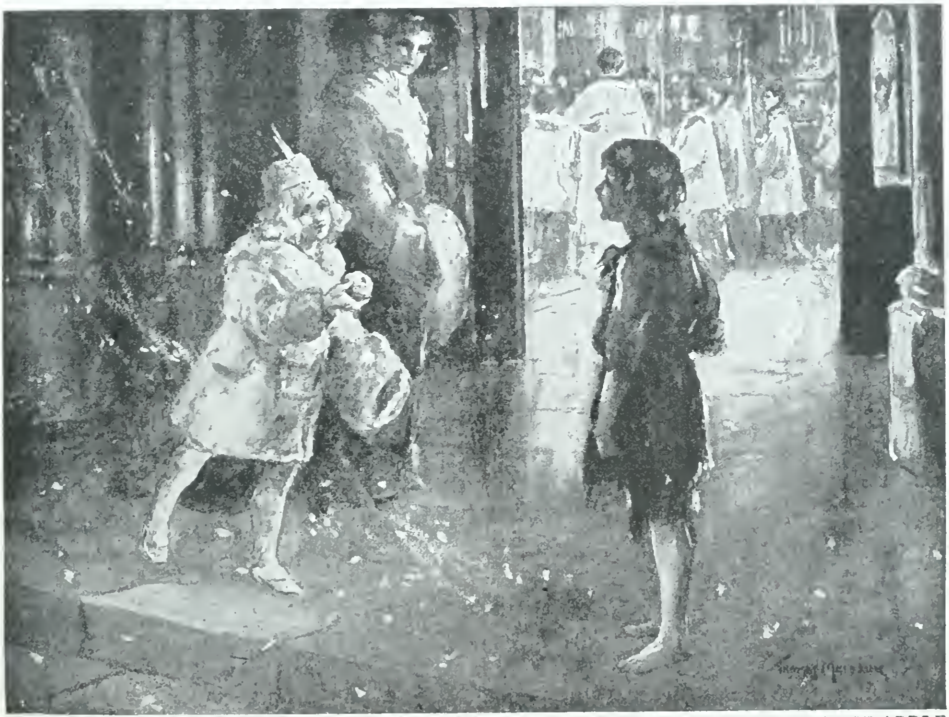
It was very quiet at the back of the church, and Hans at last ventured just inside the dimly lighted porch. He stood there a few moments, until he could resist no longer; then he suddenly shot forward and knelt down quickly against one of the chairs.

Oh, how he listened and watched as the service went on! And as he heard the beautiful music his heart felt as if it were growing bigger and bigger.

Then he saw that one of the priests was moving about the church with a golden plate in his hand, and as he held it before the people they placed money on it. Poor Hans! How he longed that he might put money on the plate, too! And as he longed an idea came to him.

Hans did not know much about God, but he *did* know that his apple was all that he had in the world—his next meal, and the only thing which had given him pleasure for ever so long. It would be hard to let it go, but he was full of a great longing, and his one fear was whether his offering was good enough.

He hugged it closely to his heart, and grew more and more excited; and then, when the priest at length drew near, he rose from his chair, and with a frightened, happy sigh he placed his rosy apple on the big golden plate. He thought with delight how pretty and red it looked among all the coins, and he watched eagerly as the priest carried it away. As he drew near the altar, all the people bowed their heads, while the priest lifted the plate high and prayed that God would accept the gifts of His people.



HE COULD HARDLY BELIEVE HIS EYES, FOR SHE RAN UP TO HIM AND HELD OUT THE APPLE

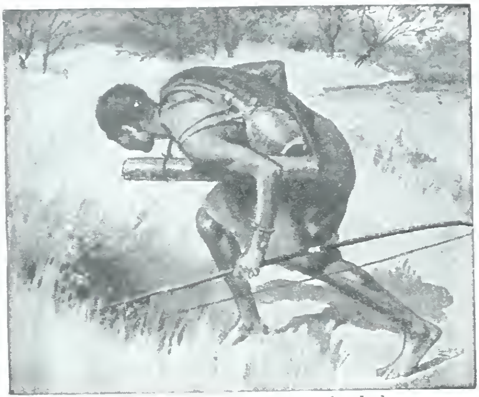
Now, as he did this a wonderful thing happened. The pretty rosy apple, which a moment before had been held so tightly in Hans's little fingers, was turned, as the priest prayed, into pure, shining gold, and into the little boy's heart there swept a big joy that was never to leave it. His face was wreathed with glad smiles, and he was full of happiness. Of all the gifts laid on the plate the little rosy apple was the greatest in the sight of the great God.

STORIES TOLD TO KAFIR CHILDREN

The little Kafir boys and girls who live in the native villages of South Africa do not know any of our fairy tales; they have never heard of Cinderella or Little Red Riding-Hood. But in the evening, squatting round the fires that blaze outside their huts, their mothers tell them tales like these stories, and they become silent and attentive.

UNCAMA'S ADVENTURE

UNCAMA was a bold hunter, and finding that a strange animal came every night to his garden and rooted up his plants, he lay in wait for it, and pursued it. The strange animal ran down a great hole by the side of the river, and Uncama followed it, and entered a wonderful country underneath the earth.



Uncama followed it down the hole.

The strange animal then disappeared, but Uncama went on until he came to a village in which a tribe of savage dwarfs lived. The dwarfs were very fierce, and gathered together to make an attack; but Uncama got away, and climbed up the hole back to his own country.

But when he returned to his people no one recognized him.

"Where is the wife of Uncama?" he said. "I have a message for her."

"Uncama? Uncama?" exclaimed the people. "Wasn't that the man who disappeared many years ago? His wife is now a very old woman."

So, indeed, she was; and for some time she did not know Uncama. The hunter was now a younger man than even the tiny son whom he had left in his wife's arms when he followed the animal down the hole into the underground country.

THE JACKAL AND THE LION

ONE very hot summer all the streams were dried up, and the animals had no water to drink. After searching for some days they found a spring, but hardly any water came from it, as the hole had not been dug deep enough in the earth.

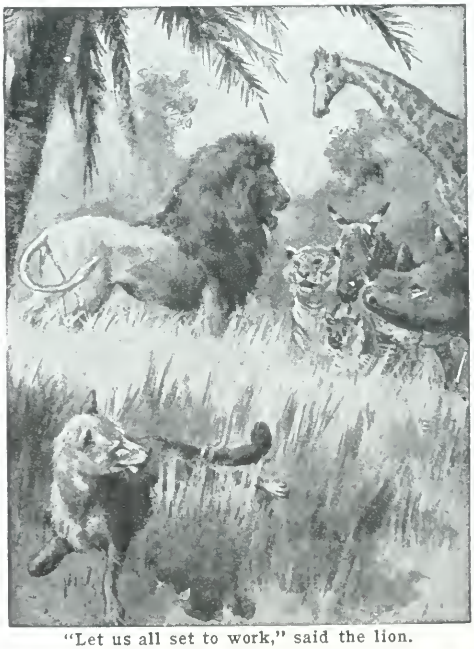
"Let us all set to work and dig out a big hole," said the lion, "so that we can get plenty of water to drink."

The jackal was lazy and refused to work with the other animals. So when they had dug the spring out, they said: "We must now guard our fountain, and keep the jackal from drinking any of our water, since he refused to work."

"I'll watch over it," roared the lion, "and if I set my eyes on that rascal of a jackal, I'll eat him up."

Some time afterward the jackal came bounding gaily up to the spring. But instead of trying to drink the water he sat down near the lion and pulled from a bag a luscious piece of honeycomb.

"You see, Mr. Lion," he said, as he munched the honeycomb, "I am not at all thirsty. This honey is really lovely."



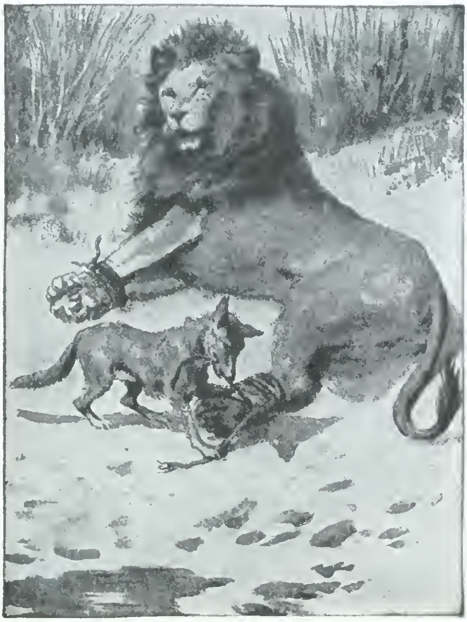
"Let us all set to work," said the lion.

"Just give me a taste," said the lion. The jackal gave him a very little bit.

"Oh, it is very good!" said the lion. "Do give me some more, my friend."

"To get the full flavor," said the jackal, "you must lie on your back, and let me pour it down your throat."

The lion at once fell on his back, and began to wave his great shaggy paws in delight at the fine feast in store for him.



He tied up the lion's paws with rope.

"I am afraid you will hurt me with those great paws of yours," said the jackal. "Let me tie them up, and then I can lean over you and pour the honey down safely."

The lion allowed him to tie up his four paws with pieces of strong rope. But instead of giving him any of the honey, the jackal trotted to the spring and drank his fill of the water. As he was merrily running off home, the lion roared out: "Mr. Jackal! Dear Mr. Jackal, don't leave me lying helpless here with my feet tied up. All the other animals will laugh at me, and I shall lose my authority over them. On the honor of a lion, I will let you have as much water as you like if only you will set me free."

The jackal reflected for a few minutes. If he did not unbind the lion someone else would, and the king of beasts would then never rest until he had avenged himself. It was better to trust in his honor. So the jackal set the lion free and gave him some of his honey, and the lion ordered all the other animals to allow the jackal always to drink at the new spring which had been made.

THE JACKAL'S TRICK

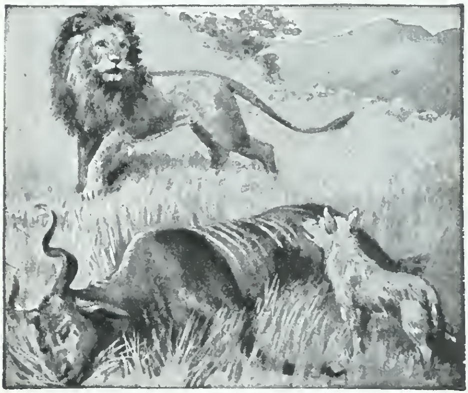
AFTER the jackal and the lion became friends they often used to go out hunting together. But fearing that their friendship would not last very long, the jackal left his den and made a house for his wife and children on the top of a very high rock. This he used to climb up by means of a long rope, which his wife let down for him.

The lion, of course, always took a lion's share of everything that he and the jackal captured. This sometimes made the jackal angry, especially when he discovered the game and tracked it down, and the lion merely came and killed it. And the lion got so lazy that he would not even take the trouble to carry home his share.

"Take all the best parts to my lair," he used to say, "and then you can come back and have the worst parts for yourself."

The jackal resolved to pay the lion out for this. And one day when they had brought down a splendid lot of game the jackal took all of it home to his own wife.

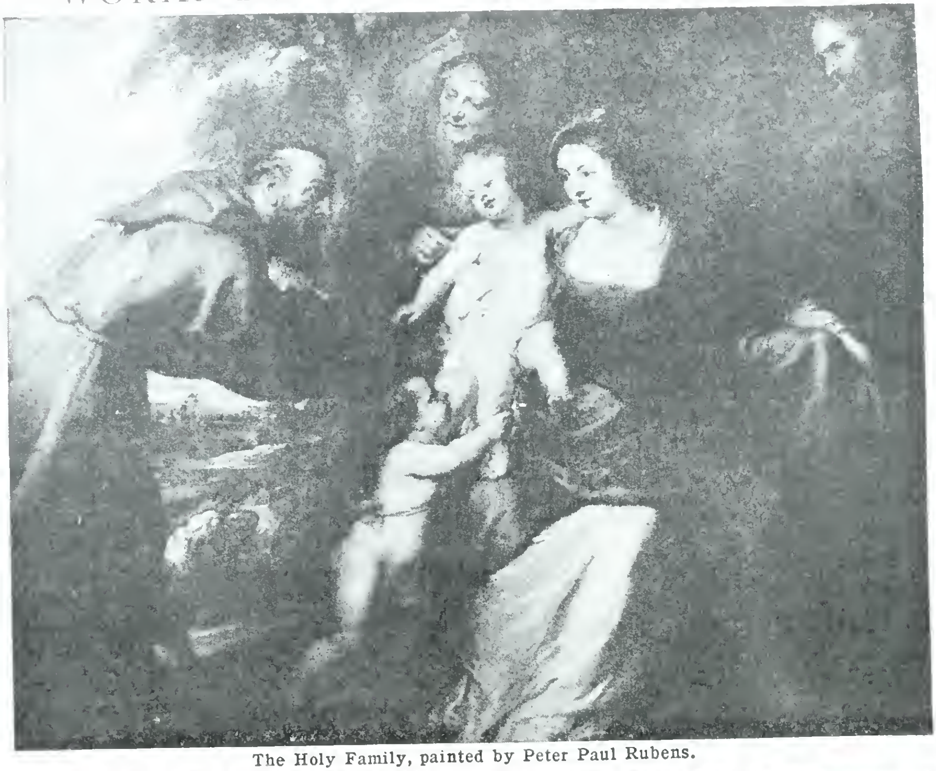
The next morning the angry lion came to the foot of the rock, and said: "Just throw down your rope. I want to come up and have a friendly talk."



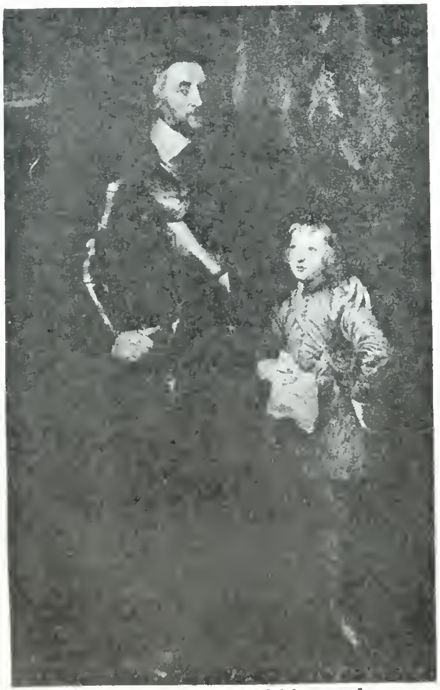
The jackal became very angry.

The jackal's wife and children were all very much frightened when they heard the lion's voice, and they began to tremble, for they knew their fate if the lion came up. But the cunning jackal had thought out what he would do. Calling out to the lion that he would lower a rope, he let down a piece of weak cord, which broke in the middle just as the lion had got halfway up, and down fell the lion and was killed on the rocks.

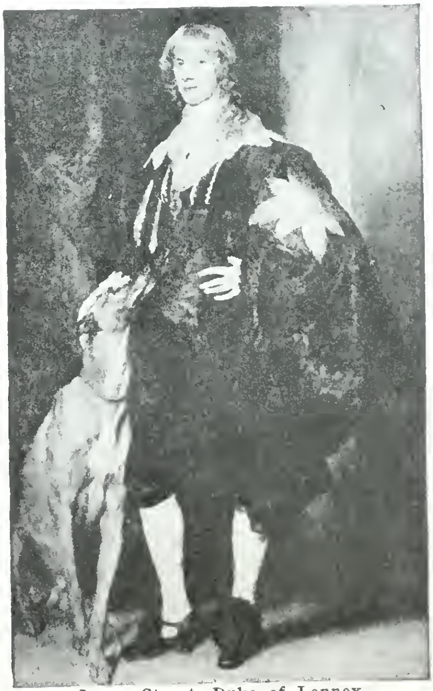
THE NEXT STORIES ARE ON PAGE 1687.



The Holy Family, painted by Peter Paul Rubens.

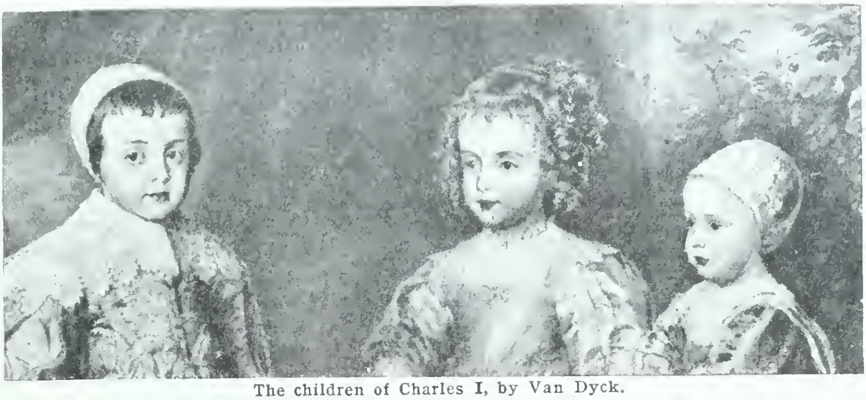


The Earl of Arundel and his grandson, by Van Dyck.



James Stuart, Duke of Lennox, by Van Dyck.

Photographs on this page and page 1590, courtesy Metropolitan Museum of Art.



The children of Charles I, by Van Dyck.

THE DUTCH AND THE FLEMINGS

An astonishing change came over the art of the Low Countries in the later sixteenth century. Many Flemish artists, blind to the glories of their native genius, which they had before them in the work of the incomparable Van Eycks and their successors, thought it necessary to travel to Italy and seek inspiration in Italian painting.

A period of imitation set in. The idealism and imagination of the Florentines and Venetians were notes quite foreign to the sturdy and beautiful art of Flanders, and the result of mixing the two strains was a mass of pictures that count for little in European art.

Another influence that made a change in the art of Flanders was the transfer of the trading centre from the old city of Bruges to the newer city of Antwerp. Of the Flemish cities, their buildings and their attitude toward art you may read more in the story of Belgium and her People. Antwerp early became the home of many industries, and before long was a home of the arts as well.

Into this prosperous atmosphere came young Peter Paul Rubens at the age of ten, for, though his father was an alderman of Antwerp, the boy had been born in Germany. He was destined to stand as a giant among the painters of all lands and all times. His lot was not like that of many geniuses, for he had no lonely years of need and hunger and bitterness. Instead, his life was like a triumphal procession, with noble patrons vying with one another to have him paint their portraits, and with pupils waiting to be admitted to his studio. Like Velasquez, he was at home in the atmosphere of courts; but Rubens had the wider experience, going about from one court to another, attended with pomp and received with honor. Indeed, he had friends in most of the princely houses of Europe. Rubens thought of an embassy to a foreign court as a holiday. You remember, it was he who urged Velasquez to go to Italy for a change.

Several years spent in Italy while he was a young man brought into Rubens' painting much of Italian brilliance and Renaissance splendor, but he kept his own distinctly northern character and built from the two elements a style of his own. He had the same largeness of conception as Paolo Veronese, and used great masses of color, with sweeping lines in his compositions. His work should, therefore, be seen as it was planned to be viewed, at a distance, upon an altar or a wall. Otherwise, it looks coarse.

He seems to have worked with his imagination at white heat while his hand was always under the control of a cool intelligence. He seems to have painted as men laugh and talk—naturally, buoyantly, with extraordinary ease. Yet the hand that used the brush with such ease and freedom was sure and exact in execution. Like Titian and Velasquez, Rubens cannot be challenged as a technician. Mind and eye and hand worked together, a masterful trio, whose skill and training were complete.

His figures appear intensely alive upon the canvas. They are robust figures, glowing with vigor and animal spirits. His exuberance indeed indicates a lack of restraint, a restlessness, which may be considered a fault in this unusually gifted artist.

The number and variety of the pictures he left makes us wonder, even when we realize that in some cases part of the painting was done by pupils and assistants working upon his designs. The master always put in the finishing touches. Portraits, landscapes, historical and other story-telling pictures he treated with equal ability, showing at his best, however, in large compositions like the Coronation of Marie de' Medici, in the Louvre. Of his religious paintings, that of the Crucifixion (known as the *Coup de Lance*) and The Descent from the Cross, both in Antwerp, are considered the greatest. Splendid in color and form, these pictures which present the death of Jesus are lacking only in spiritual appeal. Here the somewhat restless, theatrical excitement of the groups is out of keeping with the solemn event portrayed.

Rubens' full and active life came to an end in 1640.

THE FLEMISH ARTIST WHO BECAME COURT PAINTER TO CHARLES I

Another man who stands out among the mediocre artists of the times is Jacob Jordaens. He lived between 1593 and 1678. He is like Rubens, vulgar at times and boisterously good-humored. His pictures are more florid in color and coarser in type, but there are brilliance and strength in his work which give it a place in the story of art. An interesting study of his is The Three Musicians, in the gallery at Madrid. The Family Banquet, in the Dresden Museum, shows his sparkling style and his flourish.

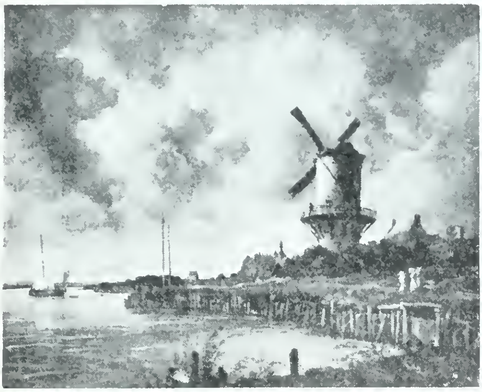
It is strange to think of Anthony van Dyck, the reserved, aristocratic gentleman, in this boisterous company. Van Dyck (1599–1641) was Rubens' best pupil, and in his early days painted in much the same way as his master, though, even then, with a slight difference. It has been said that "if Jordaens is Rubens at the Kermess, Van Dyck is Rubens as ambassador." In Italy, where he lived and painted for some time, Van Dyck was called the "Cavalier Painter." Through contact with Italian artists, especially the Venetians, his style and method were changed. And in England, where he went to be court painter to Charles I and his aristocracy, still further changes came about. He painted the royal family a great many times, and always he showed the same dignity and restraint, the same low-toned beauty. His portraits of the children of Charles and Henrietta Maria are famous throughout Europe.

THE FINE COLLECTION OF VAN DYCKS IN THE NATIONAL GALLERY, LONDON

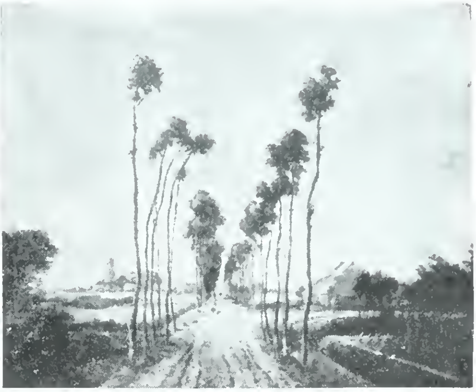
Great strength was never his; he is sometimes charged with being effeminate. His art nevertheless is to us a precious possession, partly because the eye is always pleased by his modesty of treatment, his wonderful delineation of character, his pure drawing, and partly because in his pictures survives the history of a long-dead time. Several of his paintings of the Stuarts are in the Royal Galleries at Windsor. His fine equestrian portraits of Charles in the National Gallery are very well known. You may see one of them on page 3848.

It is especially interesting to remember that although he was not himself an Englishman, Van Dyck was the father of English portraiture. In successive generations, when Englishmen began to paint for themselves instead of inviting foreigners to do their portraits, Van Dyck was taken as their model and inspiration.

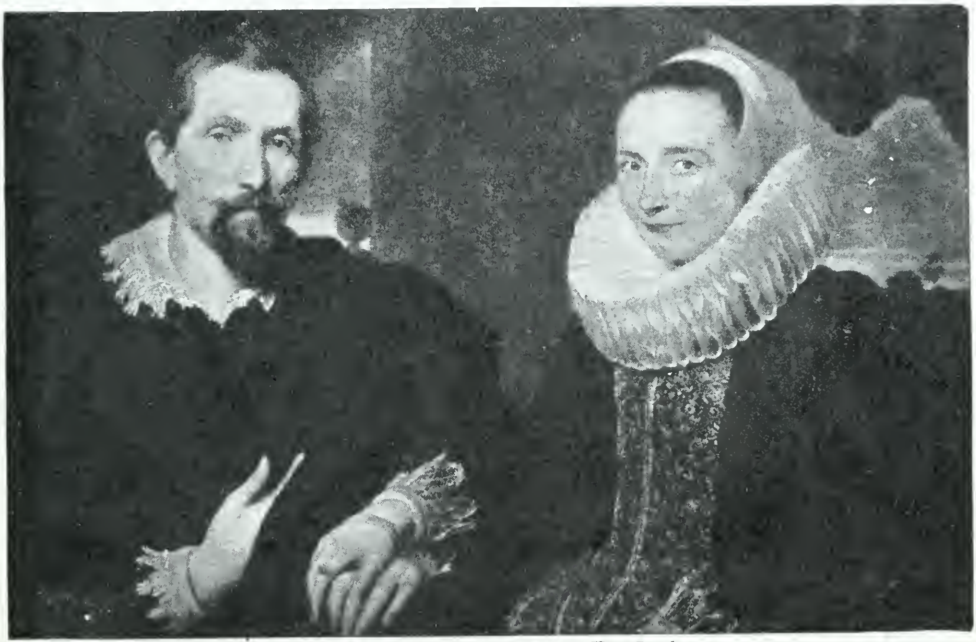
While this artist was painting industriously in England—he was responsible for about fifteen hundred pictures in all—another artist was becoming known in Flanders, whose work was of a very different type. This was David Teniers, the younger. He was born in 1610 and lived till 1690. He was a follower of Rubens, but his work was more akin to that of the Dutch. He stands out among a group of men in Flanders who loved to paint workmen and shops, booths and fairs, and to make still-life pictures. His picture Kermess, in Munich, is a fine study of peasant festivity.



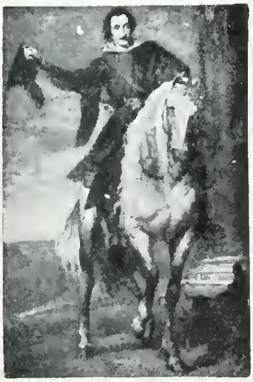
The Mill on the Dyke, by Jacob van Ruisdael.



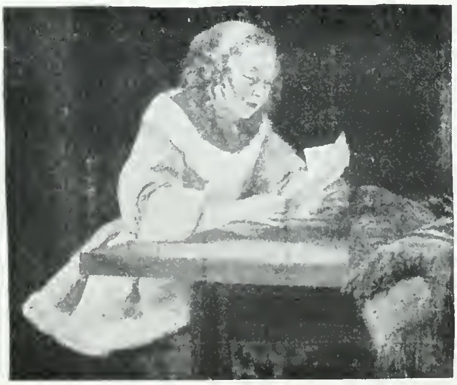
The Avenue at Middelharnais, by Hobbema.



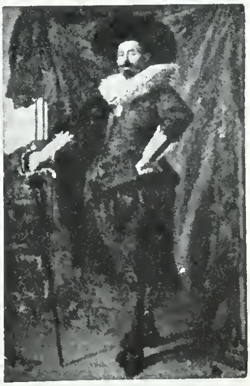
Frans Snyders and his wife, by Van Dyck.



Andrea Brignole-Sale on Horseback, by Van Dyck.



Lady Reading a Letter, painted by Gerard Terborch.



Man with a Sword, by Frans Hals.

THE PASSING OF ART IN FLANDERS AND ITS RISE IN HOLLAND

After Rubens' grandiose and florid work the homely pictures of Teniers, painted none the less with strength and brilliance, are very delightful to come upon. They show a style of Flemish art which was unique in its day and has not been rivaled since.

The work of Teniers has a melancholy interest, for all its liveliness, because it marks the ebbing of the art which had stayed so long in Flanders and brought glory to the Flemish people. Meanwhile, a new art was growing, across the little border in the neighboring land—the land of dunes and dikes.

The art of Holland in its great period was an original art which did not borrow from the outside. There was a kind of stubbornness in the independence of the Dutch people that affected their whole experience. Stubbornly they had resisted foreign rule. Stubbornly they now went about finding their own kind of art expression, without relying upon the lore of Italy or even Flanders.

Perhaps it was because the Dutch did not trifle with their painting, perhaps because they saw no need to experiment and work on "foreign" lines, that their pictures are so distinctly national, so much part of themselves. To take any twelve Dutch pictures is to take a piece of Holland, with its sturdy, clean strength and intense home feeling. The painters chose for their subjects themselves and their country; absorbed in these themes they were supremely content.

THE LITTLE DUTCH MASTERS AND THE HOMELY SCENES THEY PAINTED

Their independence had cost them dear; there was a saying that every artist in Holland was a son or a grandson of the men who had made the republic. Holland being thus their great love and joy, they asked nothing more than to mirror her in their pictures.

But it was not only national pride that set the Dutch artists to painting their homely interiors and tranquil landscape: Holland was staunchly Protestant, and would have nothing to do with carving statues or decorating church walls, painting Madonnas and saints. Her artists seemed, with a few exceptions, to turn their faces from religious subjects altogether: instead of thinking about the visions and miracles of the saints they thought about everyday people and the doings of the town.

This stay-at-home genius produced an array of pictures without parallel in European art. They are known as the work of the "Little Dutch Masters"; and they deal with firesides and kitchen tables, butchers' and fishmongers' shops, a girl's new string of beads, visits to the doctor or the dentist; people eating together, singing, making love; people gay in their youth, tranquil and wise in their old age.

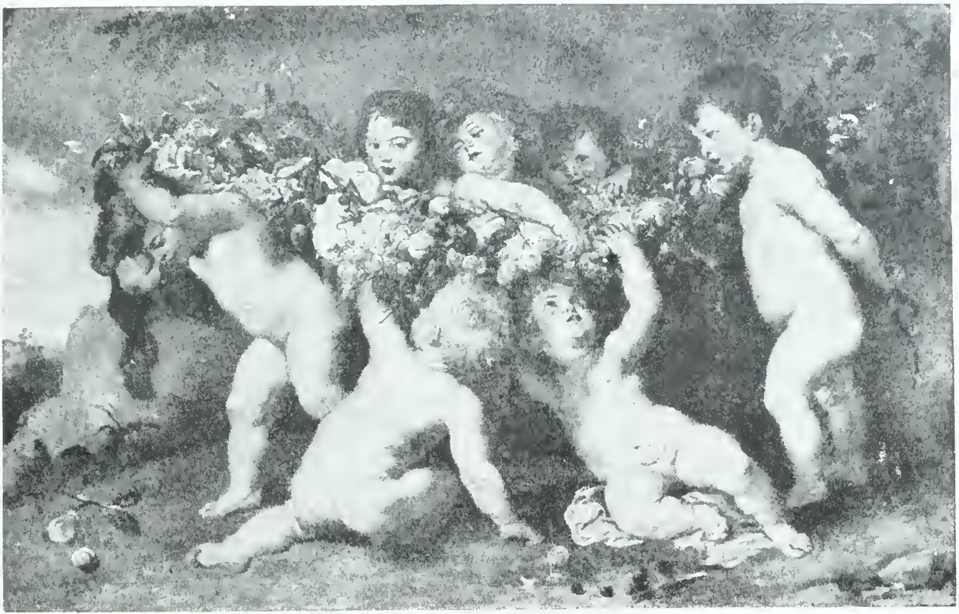
THE COLOR PAINTINGS ON THE WALLS OF THE DARK DUTCH HOMES

In addition to these *genre* pictures—a name, as we know, given to studies of everyday life—the Dutch artists painted a great number of little landscapes, their canals and boats, their fields and trees, and cattle. But whether the pictures presented likenesses of men and women, or landscapes, or cattle, or indoor scenes, or still-life groups, they were all really portrait studies, made with the intention of representing things as faithfully and truly as possible. The whole art was "intimate and sincere." The colors in the paintings gleamed in the houses like jewels against sombre dresses. The homes of the Dutch citizens were rather dark and narrow buildings, extraordinarily clean and neat; and the light entered from the open doorway or crept through the rather scarce windows, and fell on the rich hues of the canvases on the walls, making them glow and seem alive.

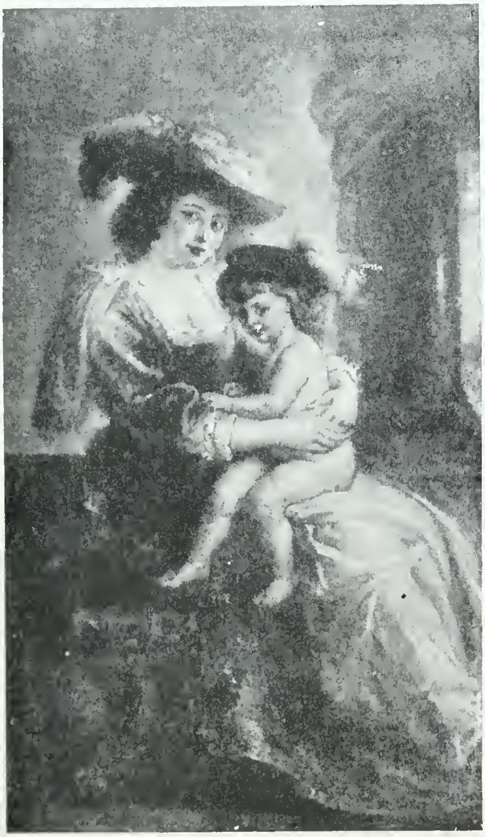
It is when we realize how intensely these home pictures mattered to the people of Holland, what care and joy was spent on them, that we see the great distance the spirit of art had journeyed, so to speak. It is a far cry from the magnificent frescoes and public paintings of medieval and Renaissance Italy to these little pictures of ordinary people on the walls of ordinary people's houses. Instead of being adored and worshiped from afar, art has come to be lived with and loved at home.

The first of the great Dutch masters—those known by individual names, and not spoken of as a group like the little islands in an archipelago—was Frans Hals, the artist of Haarlem, who lived from about 1580 to 1666. Next to Rembrandt he was the finest portrait-painter Holland produced. The sense of life itself comes from each pictured form and

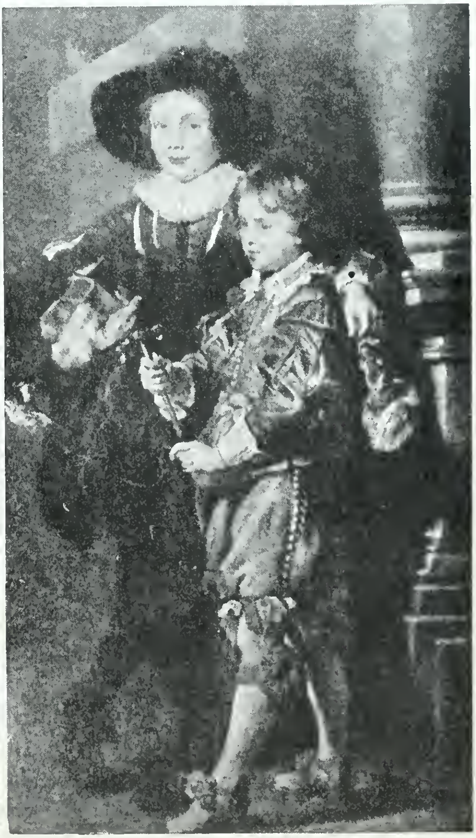
FAMOUS PICTURES BY RUBENS



A Garland of Fruit, in the Munich Gallery.



Mother and Child.

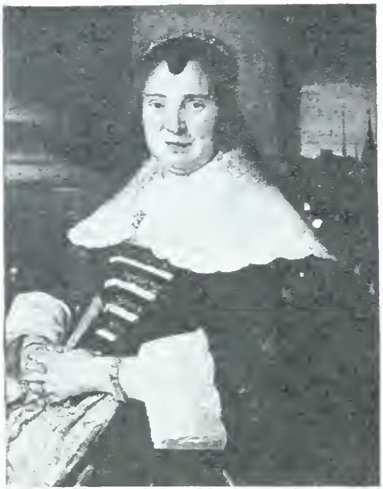


The Painter's Sons. Vienna.

face which his brush set on the canvas. He was a merry, jovial person—the laughing artist who recorded human laughter in almost all its forms. From his Laughing Cavalier to the smiling portrait of himself and his wife, Hals gaily presents a long line of merry people.

THE CHANGE THAT CAME WITH AGE IN THE WORK OF FRANS HALS

But their laughter is not senseless and inane. This jolly artist had a shrewd eye; life, thought and experience are behind the twinkling eyes and smiling lips of the men and women he painted. In addition to his many portraits, he executed from time to time large pictures for the Haarlem Town Hall, of which his masterpiece is the Reunion of the Officers of the Archers of St. Andrew—perhaps the finest of all the corporation pictures. The last two group paintings that Hals made were painted when he was over eighty years old.


Photo, Metropolitan Museum of Art.
Portrait of a Woman, by Frans Hals.

When Hals lost the boisterousness and animal spirits of his youth and middle age, a great change came over his work. He had always had command of a brilliant technique, in some instances rivaling that of Velasquez; his brush was free and fresh, rioting in color, seeming to slip about here and there, yet all the time recording faultless work. His figures were set forth in clear light, and his colors given in great masses. When he was an old man his palette lost its vivid colors and, instead, a beautiful array of grays ranged themselves on either side of black and white. His brush seemed to work of itself, with its old freedom, but within narrower limits.

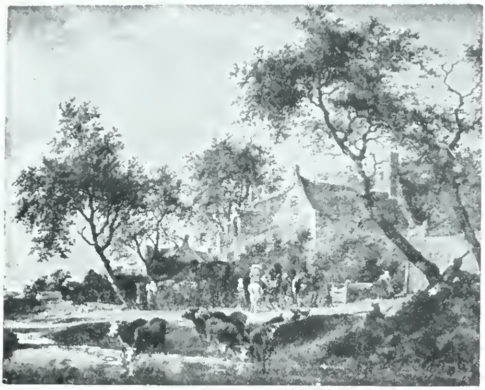
The Haarlem school, which was predominant in Holland until Rembrandt turned everybody's eyes to Amsterdam, produced not only Hals, but the Ruisdaels. These two, Salomon and Jacob, were landscape-painters who stamped the art of Holland with their peculiar and individual genius. Jacob Ruisdael (1628–1682), the nephew of Salomon, has two different periods. In his earlier life he studied and painted scenes near the cities of Amsterdam and Haarlem. These are stretches of open country, seashore or wooded dunes, and at their best give evidence of a largeness of conception, a freedom of outlook, that have seldom been equaled. Perhaps no other painter of nature has more truly rendered the transparent quality of water and of air, or has shown a more intimate knowledge of the ways of trees—their forms and growth and habits.

The skies form usually a most important part in these pictures, helping to produce the effect of endless space and, where there are clouds, to give an impression of movement and energy with the wind at large. The sea, too, conveys the feeling of boundlessness and distance and power. Ruisdael at the height of his genius seems to have grasped the bigness of nature and expressed it so nobly in color that anyone who looks at his landscapes can feel the majesty and beauty of nature in them.

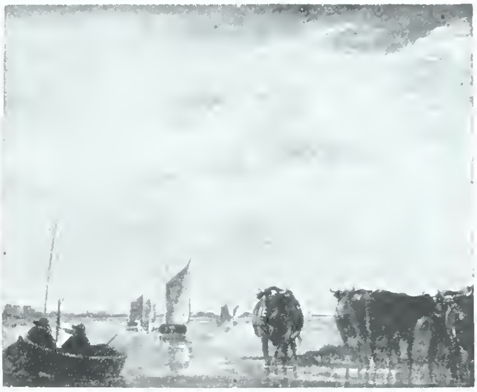
The Swamp in the Wood, a fine example of Ruisdael's best period, in Leningrad (St. Petersburg), depicts a mood of calm, while there is still a breadth and bigness brooding over the scene. And in the Rijks Museum, in Amsterdam, is The Mill near Wyk-by-Duurstede, another of the great pictures of Ruisdael's maturity.

But, finding that his countrymen did not appreciate these fine, sincere representations of the country they knew, the artist, poor and in ill-health, became discouraged and embittered. First, he turned to painting mountain scenery and waterfalls such as might be seen in Norway or Switzerland, for there was in Holland at the time a demand for such pictures. Even these more forced compositions of unfamiliar scenes he handles with a mastery and a grandeur of effect that are beyond the accomplishment of other artists who attempted the same work.

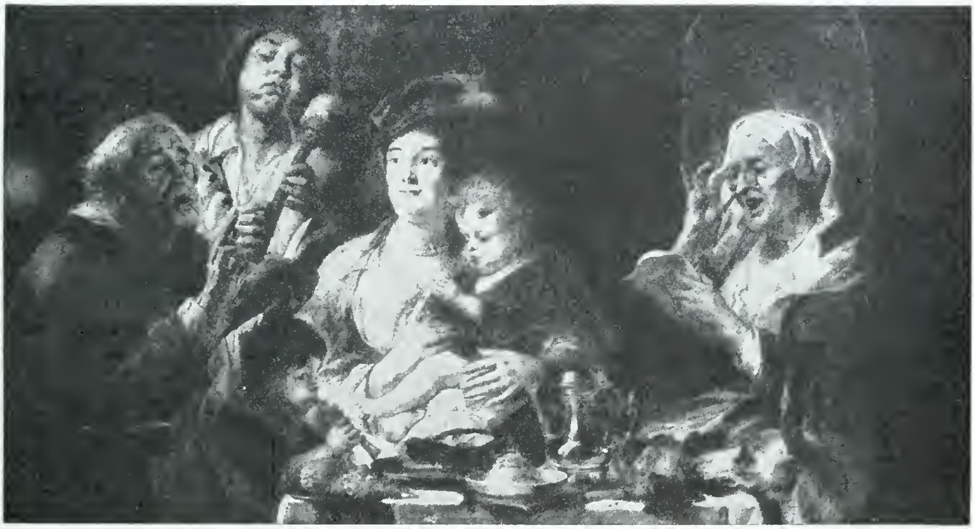
Unhappily, Jacob Ruisdael during his lifetime did not find recognition and sup-



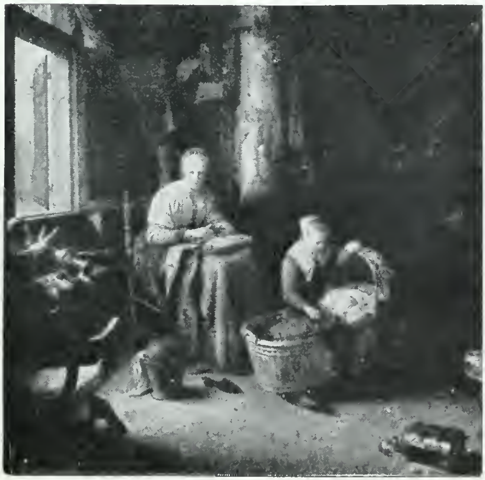
A Country Scene, by Salomon Ruisdael.



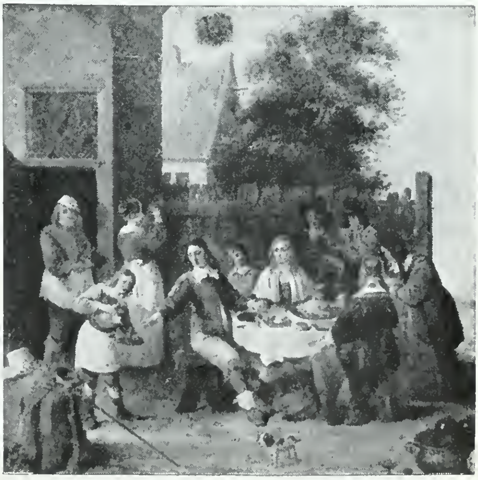
A River Scene with Cattle, by A. Cuyp.



Singing the Old Songs, by Jacob Jordaens.



The Young Mother, by Gerard Douw.



The Prodigal Son, by David Teniers.

These pictures are from photographs of the paintings, by Messrs. Alinari, Bruckmann and Hanfstaengl.

port. He died in poverty and neglect in the almshouse at Haarlem. Besides the landscapes we have named, there are excellent canvases of Ruisdael's in Amsterdam, The Hague, London, Paris, Berlin, Dresden, New York, Boston and Philadelphia.

Jacob Ruisdael holds the honor of being the greatest landscape-painter of Holland. Three or four others did very fine work in the same direction; one of them, Hobbema (1638–1709), the last great Dutch artist, comes sometimes very near the genius of Ruisdael.

But his work is very uneven, the best pictures standing out brilliantly from among a number of literal, rather commonplace records of mills, trees and water views. The Avenue of Middelharnais, in the National Gallery, London, is the picture by which the world will most surely remember Hobbema, although The Water Mill, in the Louvre, is another favorite which is worthy of the admiration it has won, and several others might be mentioned. The beautiful Avenue is "depicted with such intimacy of truth that the road to Middelharnais seems as real to us to-day as it did over two hundred years ago to the artist."

Long lines of tall, slender poplars, bordering the road, lead into the distance, their plumy tops waving against the high, far background of sky where clouds are rolling across. Ditches, a farm with its orchard, and the village on the horizon—sights familiar and homely enough—are all given with a loving touch, a sort of tender imagination that reveals something more than the objects themselves. It is a picture that one can enjoy living with. The eye is continually gratified by the alluring perspective of the uneven and fragile lines of trees and the open road between them.

While the bright day of Dutch art was still clear there was another man painting fine landscapes and two at least were making pictures of cattle. The first of these was Van Goyen, whose paintings show us the Holland that he loved, by land and river, in summer and in winter. Van Goyen was a fine painter of snow scenes. The Skaters, in the Orléans Museum, is a wonderful piece of work, showing an icebound river under an immense wintry sky.

The two great animal artists of Holland were Paul Potter (1625–54), and Albert Cuyp (1620–91). They stand quite apart from the rest of the animal-painters of Europe. There is something very real in the cattle in their pictures—solid, strong, as if the artists had mixed the art of sculpture with that of painting. But the animals have not the coldness of statuary. In Paul Potter's pictures you can almost see the warm, smoking breath coming from the damp nostrils of the cattle, and the skin is a little wet from contact with the dewy grass and soft air.

Potter is rather more vigorous and real than Cuyp. There is an intense, brute force in his pictures, as if within the horizon of his mind little except beautiful, strong animals had moved, and he painted them naturally—the things he most loved. In his most famous picture, The Young Bull, in The Hague Museum, he has made an astonishingly true portrait study of the bull itself, but the other features of the picture are far less skillful in treatment and less interesting. All his work is that of a young man, as he died before he was thirty.

CUYP, WHOSE CATTLE AND LANDSCAPES ARE SERENE AND COMFORTABLE

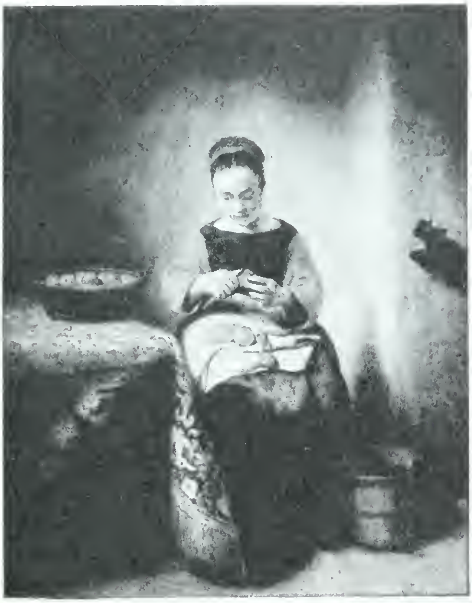
Unlike many of the Dutch artists we have been thinking of, Cuyp lived at ease and in comfort. Yet he did not choose elaborate or luxurious surroundings; rather, he enjoyed a simple country setting, where he could paint as he pleased.

This simple pleasure in life and nature can be felt in his pictures, where big comfortable-looking cattle stand or graze or lie on gentle slopes and beside calm waters, with warm sunshine over and around them. All is quiet and peaceful, reflecting a contented spirit.

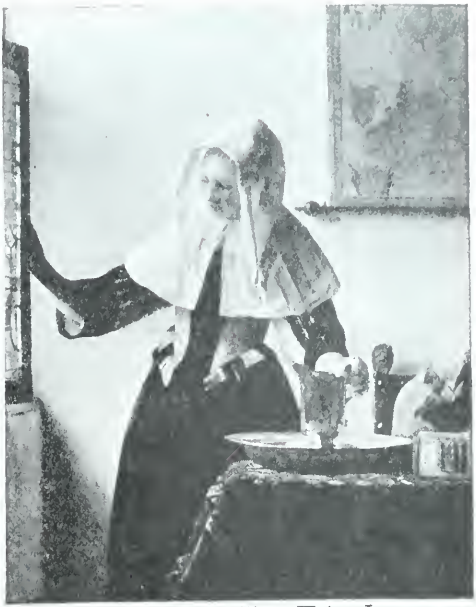
The best of Cuyp's landscapes are in private collections. His painting was not limited to this one subject, but included portraits, still-life, genre and historical pictures.

Turn almost where we will in Dutch art, we feel an intimate and homely atmosphere. It is as if we were having a glimpse of people's lives and sitting at home in their houses. Naturally this feeling is strongest when we are looking at the pictures of interiors—intimate and domestic scenes that were painted with great charm and exquisite craftsmanship by some artists whose names grow more famous as the years pass. There is no air of being on inspection, no self-conscious posing, in most of these scenes.

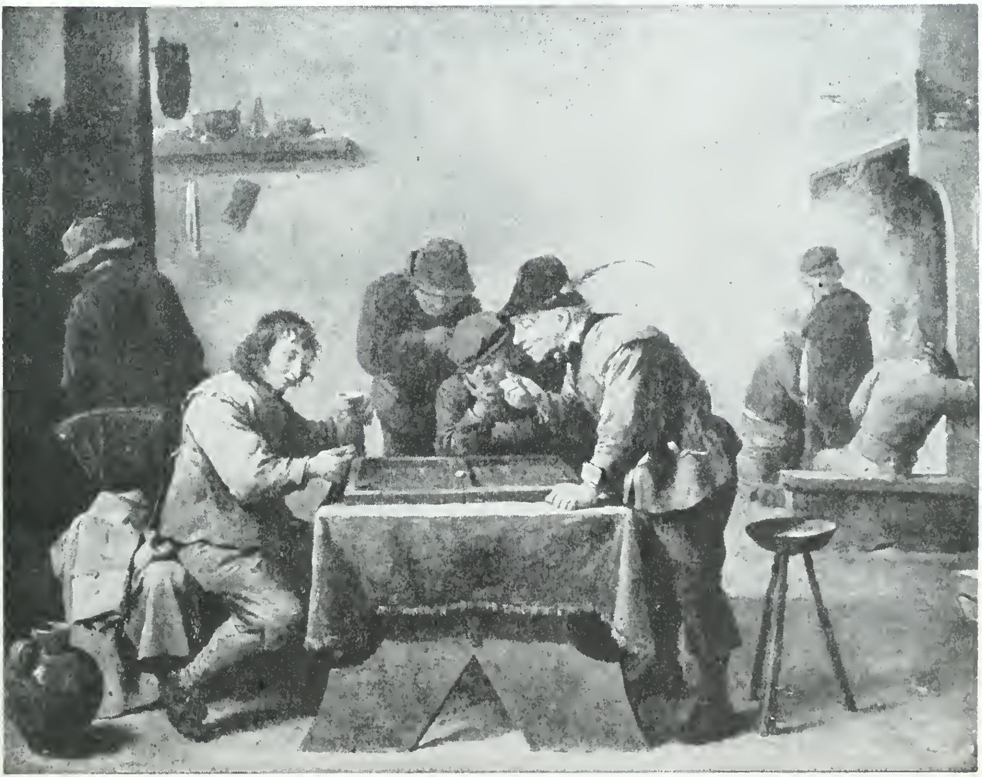
DUTCH AND FLEMISH GENRE PAINTINGS



Young Girl Peeling Apples,
by Nicolaes Maes.



Young Woman with a Water Jug,
by Johannes Vermeer.



Players at Tric-trac, by David Teniers the Younger.
Upper photos, courtesy Metropolitan Museum of Art.

They keep their privacy undisturbed. They are as natural and unconstrained as the movement of an animal or a bird.

Among the painters of this genre we shall especially consider four—Terborch, Vermeer, de Hooch and Steen.

FOUR PAINTINGS OF THE HOMELIKE AND INTIMATE DUTCH GENRE

Gerard Terborch (1617–81) lived at different times in several cities of Holland and traveled about in foreign countries, coming into contact with men of various interests and gifts, and responding to the influence of Hals, Rembrandt and Velasquez. Dignity and refined taste, self-respect and respect for the rest of mankind are felt in his pictures, whatever may be their subjects. He could make an interesting small painting of an officer writing a letter, of a lady washing her hands, of another lady with her back toward us playing a violoncello, or of an old woman peeling apples. His technique is hardly rivaled by any other artist, and his color is used with distinction and beauty of tone.

Jan Vermeer of Delft (1632–75) was an artist who left few canvases, if we judge by the number (thirty) now certainly known to be his. He seems to have taken his time in producing pictures and to have sold but few. However, those which we have we hold increasingly dear, for Vermeer painted in a way that belongs more to our day than to his own time. He was by far the most modern of the Dutch genre painters. The distinction is in his way of treating light and atmosphere, seeing his subject surrounded by natural light and presenting it by giving to different surfaces delicately differing values.

Often, you may notice, in his pictures a figure is shown standing beside a window, through which the daylight shines, touching the figure and diffusing itself through the space around the figure. Terborch's paintings, on the other hand, do not indicate where the light falls from, but have it toned as suits the artist's scheme of composition. Vermeer gets harmony by imitating nature, making a balanced arrangement of the colors and showing them unified by the effects of the diffused light. This method is best used on small canvases such as Vermeer produced during the greater part of his life. His colors are cool and luminous as well as exquisitely arranged.

Pieter de Hooch (1630–77) in the work of his best years gives us reason to remember that he came into contact with Vermeer and learned from him something of the secret of diffused light. He could make a cheerful poem of light and color by painting a picture of a courtyard depicting its share in the home life, or of a cool, dim room opening into a brighter one or giving a glimpse of canal or street beyond. All is characteristically clean and in neat order in these Dutch homes to which he introduces us. His finest pictures were done between 1655 and 1665.

Jan Steen (1626–79) has been spoken of as the "chameleon of Dutch painting," so varied are his subjects, his styles, and even the sizes of his pictures. So we cannot give him an exact place, like most of his fellow-artists. All phases of life—high life and the life of the middle and lower classes—are represented in his pictures. The life of children plays a large part in scenes of family groups, where his own household furnished his models.

HUMOR, TENDERNESS AND LARGE-HEARTEDNESS IN STEEN'S PICTURES

When one studies the "varieties of character, depicted in the personages of all ages from the baby to the grandparents, and notes the humor and tenderness in the sentiment and the embracing large-heartedness that has inspired the whole, it is to marvel at and rejoice in the uniqueness of Steen's genius." He was sometimes coarse in his humor, but never ill-natured. For Jan Steen had a genial attitude toward humanity, and welcomed any incident that gave a subject for a story-telling picture, especially an amusing one.

He sometimes cared more for the story than for the picture as a picture. In this he differed from the others, who were interested simply in the making of a picture and cared not at all how simple the subject might be. On the whole, he succeeded in bringing art and nature together in a happy union.

The smaller of the men of Holland, Gerard Douw and Mieris, and many more, lost something of strength by being absorbed in detail; but we like them, all the same; we could not bear to part with any of them. Like the great Dutch masters, they are part of the art of Holland, a separate and individual creation in the mighty growth of the world's art.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 1709.

Bactrian camels crossing a frozen lake in Tibet.

THE CAMELS

WHEN Mohammed was composing the Koran, which is the Bible of over two hundred million Moslems, he solemnly described the camel as an instance of the wisdom of God. Many men, many tribes, many nations, many empires have indorsed that verdict.

To the big populations of the East the camel has been meat and drink, house, dress, courser, war-steed, baggage animal, the one animated vessel capable of carrying man and his wares from side to side of an ocean of sun-scorched sand.

We cannot date the domestication of the camel. It runs back to prehistoric times. A papyrus more than thirty-three centuries old mentions this priceless beast. Heat and barren land in the Near East, cold lands more bitter and barren in the Far East, have made the camel necessary to human life in those regions.

What the Atlantic and the Pacific are to us, the deserts of Africa and Arabia and the sterile steppes of Central Asia are to the East. We have our ships. The camel is theirs. It is their ship of the desert. Camel caravans are their fleets, and their drivers and conductors are the desert navigators.

There are two distinct species of camels in the old world. There is the one-humped Arabian, covering a wide domain. There is the two-humped Bactrian camel of Asia, formed to face life in its unfriendliest aspect. It is able to brave piercing blasts and Arctic temperatures, to gain fatness and courage on vegetation that no other animal would eat.

All the great human tides of war and migration in the distant past moved and spread from land to land by camel-power. On they came across the wastes, borne with all their gear of war and peace by towering, padding camels.

The Old Testament scenes always have camels in the background. They stride through the Bible. They were wealth to Abraham. Job was the "greatest man of the East" because, in addition to sheep and oxen, he had three thousand camels.

Milk from the females, flesh from the young and the males, speed and strength from all; ropes, tents and clothes from the hair—these were directly derived from the animals. John the Baptist continued the older tradition when he arrayed himself in garments made of camel's hair.

All the great Bible journeys—the Queen of Sheba's gorgeous cavalcade to Jerusalem and the long journeys from all parts of the Holy Land; the convoys bringing merchandise to the Mediterranean ports for distribution throughout the West—were carried out by camel labor. And there is this romantic fact to be added, that the camels have given us a noble literature.

THE ARABIC LITERATURE THAT SPRINGS FROM THE CAMEL-DRIVER'S SONG

The first-fruits of Arab genius are camel songs—literally that. As they made their long, monotonous journeys across the burning deserts the old poetic sons of space composed verselets, keeping time with the footfall of the beasts they rode.

They sang songs of dark-eyed maidens and streams tinkling clear in dreamland oases; fierce rhymes of battle and of contest for wells, such as Isaac so often waged. The metre was fixed by the tread of the camels, and it came about that the beasts marched better in time to their masters' voices than in silence.

With a quickening of the songs they raised their heads, lengthened the paces, and hastened their speed; and new rhythms, more complex lines, and couplets grew to match the hurry of gladdened feet. And so Arabic literature grew in the desert, beaten out beneath the burning sky by men swaying and swinging to the lurching gait of the marching camel.

Some scientists say we shall still need the camel. They think that, with the great increase of coal-using and oil-burning engines with which we furnish the energy of civilization, there is bound to come a time when we shall have consumed all our fuel resources for machinery. Probably if such a thing happens we shall have new forces ready; but the mere thought lends additional interest to the desert cruiser.

The secret of its unique value lies, as we all know, in the fact that these animals are so footed that they do not sink, as a hard-hoofed mammal sinks, into the sand. They walk on it as a reindeer walks on snow, upon a spreading, padded foot.

THE CAMEL'S MARVELOUS PROVISION AGAINST THIRST IN THE DESERT

In addition to that, they can march for several days through the desert without drinking—though it is not true that a camel can support a huge burden through the wilds for two or three weeks at a time without any chance of drinking. For the camel is as fond of water as a thirsty human being, but it has a unique provision against excessive thirst. Though a cud-chewer, it has not the fourfold stomach of the cow; its stomach is in three compartments. The first two of these divisions are lined with large cells. They are the camel's storage battery, but instead of electricity they store water.

Muscles control the action of the cells, but they are what we call involuntary muscles, not directed at the will of the beast. When it thirsts we are not to imagine that it says to itself, "I will draw upon my reserves," and so sets the cells flowing. The probability is that nature itself dictates the flow of moisture to the thirsting stomach, drawing off as little as will suffice to maintain life and vigor.

The hump has nothing to do with the water supply. When the animal is fat the hump is enlarged and stands like a pyramid upon the back. During long journeys, when food and drink are scarce, the camel becomes thin and the hump is reduced in size. Undoubtedly a measure of support is derived from it. The animal unconsciously draws upon that reservoir of fatty nourishment for the energy that it exhausts over its work and privation.

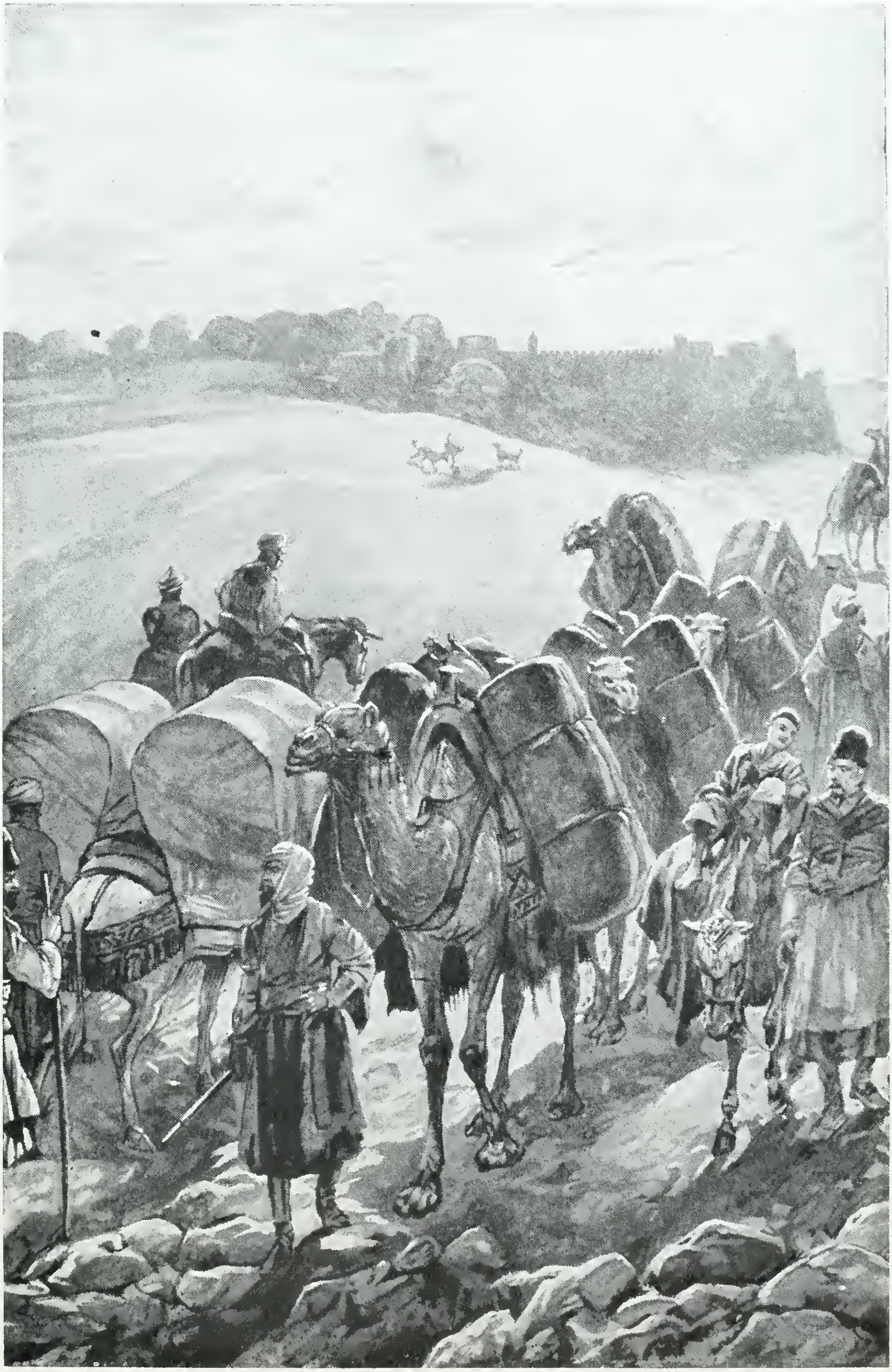
A PRIMITIVE CREATURE THAT IS RATHER LIKE THE REPTILES

There is no need ever to confound the Arabian camel with the Bactrian. The first is long-limbed, with large spreading feet, soft for the desert sands. The big Bactrian is mounted on shorter legs, with smaller but much tougher feet, designed to withstand the wear and tear of the rocks among which it has to move. Then, too, the Arabian camel has one hump and the Bactrian two.

The camel, for all his thousands of years about human habitations, remains a primitive animal. His bone is the finest thing nature has ever done for the frame of an animal; it is like ivory, dense and hard and splendid. In fact, camel bone is used in enormous quantities as a substitute for ivory. This is not a mark of backwardness. The primitive feature is discovered in the blood. The shape of the blood corpuscles in the camels and their relatives the llamas is oval like those of the birds and the reptiles. In all other mammals they are circular.

We find another reptile-like feature in the animal. Its temperature is not constant like that of man and the other mammals. It rises with the surrounding heat,

THE CARRIER OF THE DESERT IN ASIA



A TRAIN OF MERCHANDISE LEAVING A TOWN IN THE DESERT OF CENTRAL ASIA it falls with the drop of night's fierce winds. We vary little more than a degree whether we are in the tropics or the Arctic; the camel's temperature may rise and fall several degrees in the course of twenty-four hours.

One would imagine that it must endure agonies in the noonday glare, for there is only one small patch behind the neck from which sweat glands pour out perspiration to relieve the heat of the animal's body. However, when resting it prefers to kneel in the full glare of the sun rather than to seek shade.

THE MOST MOROSE AND WICKED OF ALL DOMESTICATED ANIMALS

The camel goes grumbling beneath its burden through a desert in heat which would scare a lion or tiger or leopard to the deepest shade of the jungle. He always grumbles. The terms between man and the camel seem to be rather like those between Bill Sikes and his ferocious bulldog. The two are constantly together; but when Bill is not beating the dog the faithful brute is at his calves and heels, or worrying the poker with which he persuades it to do the thing it decides not to do. But the dog died in its last leap from the roof to reach Bill's shoulders, you will remember.

And the grumbling, biting camel dies with and for the man whom it tries every day to kill. We have no other case like this in all the annals of domesticated animals. Some camels are more morose and wicked than others, but they are not gentle or amiable in Oriental service. This is particularly true of the common burden-bearing camels. The swifter riding camel, called the dromedary, is often better treated, and his disposition is not always so bad; but even he is not a gentle beast.

THE VICIOUS JAWS THAT WILL SEIZE A MAN AND DASH HIM TO DEATH

White men during the World War had much to do with camels, and some of them, with the instinct for arousing kindliness in animal hearts, got on good terms with their ugly beasts.

It must be because Orientals have so long been the masters of camels that the animals have deserved so ill a reputation. They love their Arab horses as they love their children; but they treat the all-necessary camel as they treat their aged women. And the camel remembers.

There is not a moment of the day when a camel will not bite its master's arm off if it has the chance. It can inflict one of the worst crunching nips possible by any pair of jaws. It will seize the hand that feeds it; it will take a piece out of a man's back or leg; it will fasten upon a man who rides past it in a narrow mountain way and dash him down to death. Thousands of years of ill-treatment have bred viciousness into it as fixedly as hardihood.

The Oriental has often no mercy for animals. When native camel-owners work for foreigners this is the sort of thing they sometimes do. The British transport allots 364 pounds each to camels doing the Khyber Pass journey and drives them moderate distances each day; the native owners load them up with nearly three-quarters of a ton and drive them eighty miles in three or four days. If the animals die, well, it is Kismet; if they survive, they are turned out to pasture for a week and recover.

But what would be rich abundance to a horse would not be acceptable to a camel. For him the lush grass of the meadow is not food; give him the prickliest thorn, the scrubbiest thistle-like growth, and camel paradise is there. One has seen a gaunt Arabian camel stride across a field ready for hay-making paddle through a running brook, which camels abominate, to reach a hedge composed of forbidding briar and bramble, and feast with rapture.

THE CAMEL'S FEAST OF BRACKISH WATER AND BITTER WEEDS

The natural food of the animal is the ungenerous product of the desert. Where other animals would perish of starvation he waxes sleek and prosperous. The Bactrian luxuriates on bitter weeds and mineralized water, salt to the taste. It is marvelous to what ends such food can be turned. Had it been otherwise, had the camel required sustenance like that of deer and cow and antelope, human history would have been different.

We never could have crossed the deserts; the steppes would have been a barrier between Asia and Europe not to be passed. Solomon could not have built his temple at Jerusalem; the Phœnicians could never have got their wares to the coasts; tea, spices, the silk and satin and gems of the East could never have come to us had not camels fed richly on poverty's fare.

For, let us not forget that before the

sea highways were navigated everything that came from India and China and the nearer East traveled, every ounce, every length, every carat of it, on the backs of camels which ate food which would be poison to any other animal in human service.

And it has all been done with a grumble and an attempt to kill the man who led. But camel-drivers, from Mohammed to our own day, have a law of their own. Their motto is, Mastery. "When slaves hold the whip, let drivers quake." They have held the whip in more ways than one.

There was a famous, or, rather, infamous, beast in government service in India. His temper was a cyclone in camel-skin. He was hated, yet much admired, for he had killed two men. So his driver put a cluster of ostrich feathers on his head, marched him at the head of the caravan and told of his deeds with exultation.

THE VICIOUS MAN-KILLING CAMEL AND HIS DRIVER

A distinguished English officer approached the man one day, and the driver, telling the record and forgetting its evil hero, took his eyes from the vicious animal. The camel lunged at him open-mouthed, but the man was too quick. He darted aside, then flew at his beast. He sprang at its head, seized its upper lip with his teeth, and shook it violently. The camel, killer of two, knew its master, became quiet as a lamb, and was docility itself.

Now those are the terms upon which war has always been waged in the East with camels. We need not wonder that they have a reputation for ferocity and cunning unmatched among domestic animals.

Even among themselves they fight dreadfully. Lacking horns, they use the teeth, and with these they seize a leg, and wrench and tug until they have thrown the rival, then they drop upon him with the knees, and pound him to death. A contest between two bull camels is a grim spectacle; and it is a dangerous one, for the example of the first two is infectious, and will set all the other males roaring and battling among themselves with a fury not to be described, and a damage to merchandise not to be mentioned in the hearing of a native owner.

It is just possible that a few camels in the heart of inaccessible Tibet are wild. They may be descendants of animals which once were tame. There are free camels in the heart of Central Asia, wild, wary, wicked. No one can approach them in their deep sand. Some think that these are runaways from a dead civilization. Two and a half centuries ago great sand-storms blotted out towns and peoples in Asia. The free camels may be the posterity of those that weathered the storm. Other scientists think they have always been wild.

HOW A FLEEING NATION WAS SAVED BY THE STRENGTH OF THE CAMEL

If we could liberate and enlarge the dumb thoughts of these hardy beasts, what tales of terror and man's agonies they could tell! If only we could put speech into the mouth of the two-humped camel that carries children at the zoo, and could make him recall scenes from the life of his ancestors, which De Quincey cites, during that dread retreat of the Tartar host from the Volga to the Great Wall of China!

Camels alone saved the fleeing survivors. Oxen, sheep, mules, asses, horses, all were dead, when the fugitives, after a five months' retreat, plunged with their pursuers into the lake of Tengs. These animals, on which they had started in the snows of winter, and crossed the ice and flooded waters of Russian rivers—these camels, "looking like the mummies of antediluvian animals, without the affections or sensibilities of flesh and blood, lifted up their speaking eyes to the eastern heavens, and had, to all appearances, come out of this long tempest of trial unscathed and hardly diminished." They had triumphed over the rigors of a winter which left men and women lying frozen stiff and dead around the camp fires.

THE STRANGE PAGE OF NATURAL HISTORY WRITTEN IN THE FOSSILS

Yet, for all his wondrous mastery of a melancholy forbidding land, the Bactrian camel is not a native of the place in which we find him. The story of his origin and wanderings matches all the romance of his latter-day career in domestication.

Though fossil camel forms suggest that the Arabian camel may have arisen in India, the general opinion is that all forms of the camel tribe began in North America. Every type of camel is to be found in that great book of unwritten history, the fossil and other deposits of America.

It is believed that the camel originated there, passed through many forms, as did other types which we have already studied, and then came to a parting of the ways. The true camels went off into Asia by a land-bridge existing where Bering Strait now sunders two continents. More primitive forms wandered by high mountain ways down into South America. The remainder, left in North America, were overwhelmed, either by Time's own slow poison or some other mysterious agency. Remains in the rocks show that there were other branches of the family which died out long ago. The giraffe-camel was so called because of its long neck and not because it was related to the giraffes. There was also a tiny gazelle-camel many years ago.

Fortunately those that picked their way along the untrodden mountains throve. They are there to this day. The South American llamas are the only existing cousins of the camels.

THE MOUNTAIN-LOVING AMERICAN COUSINS OF THE CAMEL

First we have the wild Vicuña, the smaller of the two wild species. They are hillmen all. During the wet season of each year they keep to the higher ranges of the Cordilleras. They avoid sharp ridges and glaciers and feed in the meadows which these mountains clothe with a scanty herbage. With the coming of heat the mountain verdure parches. The vicuñas, therefore, descend from the heights.

Soft-footed like the Arabian camel, they are extremely agile in the places they choose for life and liberty. Though the tribe is renowned less for sagacity than toughness, they have the wit to set sentinels to guard the feeding herds.

The Guanacos are the larger, heavier species, massing in herds five hundred in number in the mountains, or reveling in the bleak discomfort of the plains of Patagonia. The llama which the ancient Peruvians domesticated was taken from the guanacos. The Alpaca was the smallest guanaco, kept entirely for its woolly hairy fleece. But the big tamed guanaco was indeed a wonder.

For when Columbus reached America there was not a horse on all the vast continent, and no animals had been tamed except the wolf, trained into a friendly dog, and this llama.

The llama was the packhorse, the hackney and the beast of burden. The mysterious Peruvians had added several remarkable features to their fantastic civilization. They had perfected the growth of maize, they had brought coffee and cocoa to a pitch of perfection never since surpassed, and, above all, they had captured and done with the llama what the ancient East had done with the camel. The male llamas did the work and supplied flesh food; the females were kept for their milk; and, as we have seen, the alpacas were the fleece-bearers.

THE LLAMA STILL A VALUED POSSESSION IN PERU

The Incas had done as well in the breeding and perfecting of these animals for their several qualities as the old mystery men of the unknown past had done, a thousand years before, in persuading sheep to grow flowing wool.

The types that we know to-day were already fixed, high tribute to the skill of these semi-savage geniuses. It is thought that they themselves established the breed of alpacas from the larger-bred species of guanaco, the one for weight-carrying and milk, the other cultivated for wool, as we have cultivated the jungle fowl for eggs. Llamas are still used to carry burdens, but not to the same extent as formerly. When the llama is displeased it discharges foul saliva at the object it dislikes.

MAN'S UNWILLING SERVANT THE WHOLE WORLD OVER

Such is the story of the camel tribe. The camel has been taken about the world like cattle. It helped to carry up the wire which fenced in Australian farmers from the devouring rabbit, and on the return journey it brought down wool to the ports. It has been taken back to its original home, North America; it toils in Zanzibar and challenges cattle in Italy; it is a valued servant in the Canaries and an esteemed friend of carrier and cultivator in Spain.

Just before the Civil War the United States Government attempted to use camels to carry supplies across the deserts of Arizona and New Mexico. The war interrupted the experiment, and many of the animals escaped. For years hunters and prospectors saw them in the wilds, but it is believed that they have entirely died out. However, stories of their continued existence are occasionally reported.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 1717.

THE DAILY LIFE OF THE CAMEL

EARLY MORNING IN THE DESERT—AN ARAB FAMILY WARMS ITS HANDS WHILE THE CAMEL LOOKS ON

THE SHIP OF THE DESERT—AN ARAB LADY ALIGHTS FROM HER CAMEL

ON THE ROLLING SAND HILLS OF THE DESERT

AN ARAB CARAVAN ON THE MARCH

NEAR THE PYRAMIDS

THE ARAB'S HOME

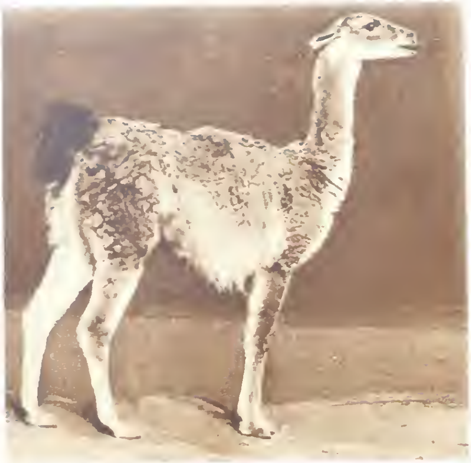
A PRECIOUS CARGO

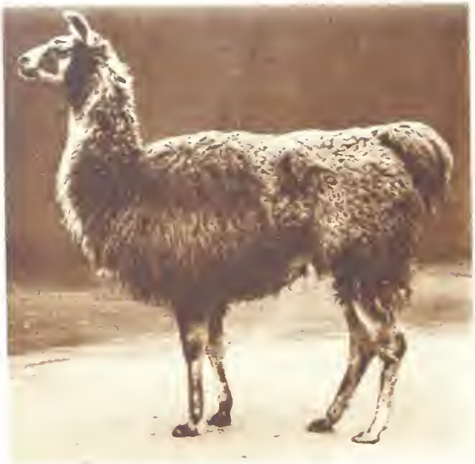
The middle picture at the bottom is copyrighted by Underwood & Underwood, New York.

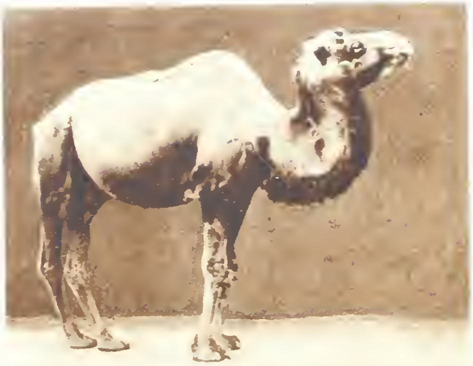
CAMELS LOADED WITH PALM-LEAF STALKS ON THEIR WAY TO MARKET

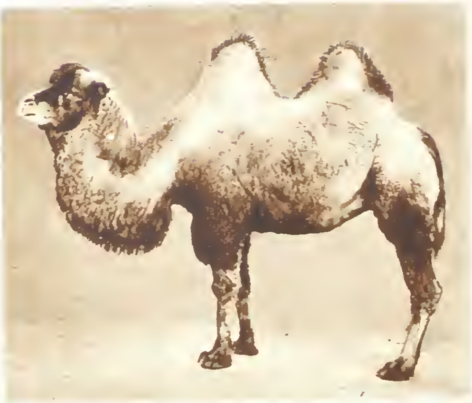
LADIES OF ALGERIA MOUNTED READY FOR A RIDE

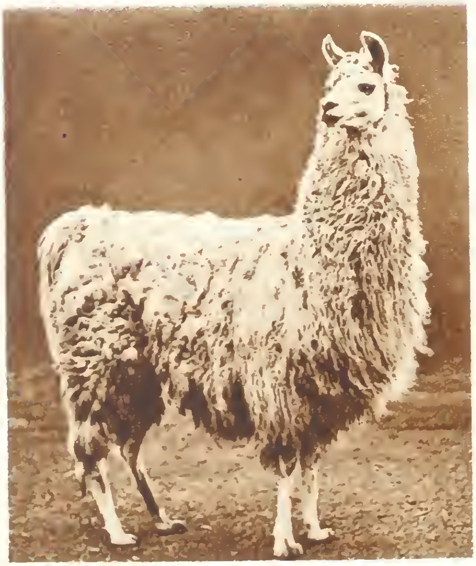
PLOWING ON THE BANKS OF THE NILE WITH A CAMEL TEAM

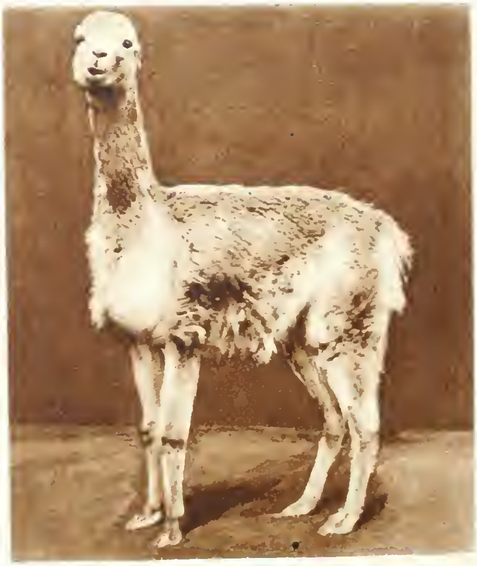

THE GUANACO OF PATAGONIA


THE LLAMA OF SOUTH AMERICA


THE ARABIAN CAMEL


THE BACTRIAN CAMEL OF ASIA


THE ALPACA, OR PERUVIAN SHEEP


THE VICUNA OF THE CORDILLERAS

Children of China at school.

WHICH IS THE BIGGEST NATION?

THE greatest nations of the world by far are Asiatic peoples. The biggest of all is China, which in 1923 was believed to have a population of 330 millions. This means that about every fifth person in the world is a Chinese—a fact which is very difficult to realize.

Next to China in size comes India. The Indian Empire conducted a census in 1921, when it was found that the population was only a little less than that of China. The count came out at 319 millions. India, however, is not a single nation, and this includes, of course, all the many races which inhabit India and which we commonly call Indians. So we see that China and India together have about 650 million people, or more than one-third of the entire population of the world.

Japan is another very big Asiatic nation. She has 59 millions in Japan proper, while the Japanese Empire contained about 78 millions in 1923.

The great white nations are headed by Russia. It is difficult to say how the Russian people have become divided up among the various states into which the Russian Empire has been split since the World War, but it is probable that Russia in Europe and Asia had about 130 million people in 1923.

Next to Russia comes the United States of America, with about 108 million people in 1923. The growth of this country has been more rapid than that of any other nation in the history of the world. Fifty years before 1923 she had only about 37 millions, so that she increased three times in half a century. This is partly because millions of people flocked to her from Europe across the Atlantic to earn a better living in a naturally rich country. More would do so now if the United States would have them, but she has now enacted severe laws to restrict the number of immigrants who may enter her ports in a year.

The third white nation in number is Germany, which in 1923 had about 63 million people.

The fourth big white group is the British Isles, which in 1923 counted about 48 millions. In addition to the white people in the British Isles, there are about 17 million more white people in the British Empire overseas, including the French Canadians and the South African Boers. In the British Empire as a whole, therefore, there are about 65 million white people, forming a bigger white nation than Germany. In addition to its white inhabitants, the British Empire has 385 million colored people, making a total of about

450 millions. Thus, if we take the British Empire's inhabitants as a whole, it is the biggest unit in the world, and accounts for about one in four of all the world's people.

Next in order after the British Isles come Italy with 40 millions, France with 39 millions, Poland with 27 millions, Spain with 23 millions, Rumania with 17 millions, and Jugo-Slavia and Czecho-Slovakia each with 14 millions. Brazil, largely white, has about 30 millions. Three of these countries, Poland, Jugo-Slavia and Czecho-Slovakia, came into existence as new political states—although Poland was a nation many years ago—as a result of the World War. It is curious to notice that France, which, next to Russia, was the biggest white nation at the time of the Franco-Prussian War in 1870, fell at the time of the World War sixth among the white nations, and year by year falls to a lower place through the decline of her population.

IS THE POPULATION OF THE WORLD STILL GROWING?

Not only is the world still growing, but its people are increasing in number at a very rapid rate. It is not possible to state exactly what that rate is, for it varies considerably from time to time, but there is no doubt that the world is advancing to a much larger population.

Not all countries conduct a census, as we call the official counting of a people, but most of them do, and in the year or two following the World War many of the chief nations published new figures which show that the world contains even more people than was thought to be the case. If we take the official census figures (census is Latin for "register"), and add to them reasonable estimates for places like uncivilized Africa, where proper counts are not made, we find that the world as a whole has nearly 1,800 million people.

These 1,800 millions are very unequally divided among the five continents. The biggest continent is Asia, which has about 900 millions. Next comes Europe with 500 millions. America (North, South and Central America together) has about 220 millions. Africa's peoples may be roundly estimated at 150 millions. Australasia and Oceania, including Australia, New Zealand and the various islands of the South Seas, contain less than eight million people. The aggregate of these figures is 1,778 millions for the world. If the world were as thickly populated as Belgium or Great Britain it would contain enormously more people.

There is no doubt that the great fertile areas of North America, South America, Africa, Russia and Australia could accommodate and support thousands of millions of people, and that, indeed, until these places are better populated and developed, the world as a whole will not make the best use of its resources. It is therefore very important to know that the world is still growing, and that it has grown since 1800 from 700 millions to nearly 1,800 millions.

DOES A BIRD ALWAYS SING THE SAME SONG?

We do not yet know as much as we should about the songs of birds, and this is a pity, because what we do know is very interesting. We are sure that various kinds of birds have various songs of their own, but the more we study other kinds of living creatures the more we find that individuals differ as we do. We think all Chinese and Japanese look alike: they think we all look alike. And birds of the same kind vary to some extent.

It has been noticed that certain kinds of birds change their song as the year advances. The tune is not quite the same in early spring as in summer. Sometimes the difference is definite, and can be expressed in terms of music.

Various interesting results are observed when a bird of one kind tries to teach its songs to birds of another kind: but we do not yet know much about this. It is remarkable, however, that young cuckoos, though they are hatched in the nests of birds of other kinds, keep their own song.

HOW FAST IS A FISH ABLE TO SWIM?

Very few investigations have been made to decide this question, but lately a Belgian observer has been timing salmon, and has concluded that they can swim a short way at the rate of about ten yards a second, or about as fast as a good sprinter can run. An American observer found that a fish called the alewife could swim at about the same rate.

It is probable, however, that many fish can swim much faster than these figures show. Sharks often accompany swift steamers for days, and even porpoises can keep up with a liner for a long time. It is, as you can imagine, difficult to measure the speed of a fish.

WHY DO THEY SAY THAT STRONG TEA IS BAD FOR US?

Tea contains, besides theine and aromatic substances, a substance called tannin, or tannic acid, which tends to dry up the digestive juices and produce indigestion. This is present in strong tea, or in tea that has been steeped for a long time. It is well, therefore, to take not too much tea and to infuse it only for a few minutes. If boiling water be poured on the tea leaves, three minutes is enough to extract from them most of their flavoring and aromatic substances. If the tea be then poured out, it will not contain harmful amounts of tannin. If it is allowed to stand, the tannin in it continues to increase for nearly an hour, and it becomes a very unwholesome drink. A very good plan is to put the tea leaves in a little silver cage which can be sunk into the boiling water and then removed with the leaves after three minutes.

WHO STARTED THE IDEA OF COLD STORAGE?

It is curious to remember that Francis Bacon, the great philosopher, was one of the first to think of preserving foods by means of cold storage. His friend Hobbes, another famous philosopher, tells us that Bacon lost his life in making an experiment in refrigerating.

He was riding in his coach near Highgate when snow was on the ground, and the thought came to him that fresh meat might be preserved as well by snow as by salt. He determined to try the experiment. Alighting from the coach, he went into a cottage and bought a hen, and had it prepared for cooking. Then he stuffed the body with snow, and the snow so chilled him that he fell ill and could not return to his home in London.

He was driven to the Highgate house of his friend the Earl of Arundel, where he was placed in a damp bed, and the result was that in three days he was dead. Bacon had carried the frozen hen with him to the earl's house, and he lived long enough to know that his experiment was a success. That was the very beginning of a gigantic industry. Had it not been for the discovery of the freezing process of preserving meats it would hardly be possible for the millions of people gathered in London or New York to be supplied with flesh foods. Not all food preserved by cold is actually frozen, but is kept near the freezing-point.

Bacon's method has, of course, been greatly improved, as you may learn on page 535; but in its essence the process is the same as that in which he led the way—to his own undoing, but for the good of millions of people in succeeding generations.

WHAT IS A DELTA AND HOW IS IT MADE?

If we look at the map of Egypt, we shall find the Nile, which is a very good example of a river with a delta at its mouth, and we shall notice how the river, when it meets the sea, spreads out into a shape something like a triangle. Now that is the shape of the Greek capital letter *D*, the name for which is *delta;* and so land of this shape and origin made at the mouth of some rivers is called a river delta.

A river consists of moving water, and the motion of the water has power to rub away from the bed and the banks of the river a large quantity of solid material, which is not melted or dissolved in the river-water, but is carried down by it. Now, when the river-water meets the sea, its pace slackens, because it is opposed by the weight of the sea-water. Therefore, the solid matter held in the river-water is likely to sink and form a wide bed or bank of mud. When, as in the case of the Nile, there are two or more main branches, the deposit inclosed by these and the sea takes the form of a triangle, and so are called deltas. Deltas are nearly always found at the mouths of those rivers flowing into lakes, or inclosed seas, or sheltered gulfs, because of the absence of opposing currents.

WHY DO THE BRANCHES OF TREES GROW SIDEWAYS?

Our best way of understanding why the living creature we call a tree behaves as it does is to find out the use to which it puts its branches. They exist in order to bear the leaves by which the tree breathes, and by which it also feeds on the carbon-dioxid gas of the air under the influence of the sunlight. It is the tree's business, then, to grow its branches in such a way that the leaves they bear shall be exposed to the sunlight as fully as possible, and so that they may produce as many leaves as possible. Therefore, the tree throws out its branches fairly equally on every side, and in growing sideways all round they are thus best arranged to expose the leaves to the sun's rays.

WHY CAN WE HEAR A NOISE LIKE WAVES IN A SEASHELL?

The pretty idea in this question is just a poet's fancy and nothing more. For the truth is that we only imagine a likeness between the sound of the shell and the sound of the sea. The shell is one of those things which can pick up and make stronger certain kinds of sounds. The wooden part of a fiddle does this. If you take it away and play on the strings without it, they make a feeble, thin, unpleasant tone. The things that make sound resound are called *resonators*. The body of a fiddle is one, the sounding-board above the pulpit in churches is another, and a shell is another.

What the shell picks up are the very slight sounds going on all about us. It is really never quite quiet and the shell picks up sounds so slight that we do not hear them at all without the shell. Some scientists built a sound-proof room. People inside it heard their own hearts beating. But there were cut out of the room all the tiny noises that usually go on, and when a shell was held to the ear nothing at all could be heard. The shell is only a telephone. If no sounds come to it, it is silent and can give nothing out.

WHAT MAKES THE GLOW IN AN ELECTRIC LAMP?

Electric light is quite different from the light of a fire, or a lamp, or a gas-jet, because it is not made by anything burning. So electric light does not use up the air of a room. When we turn it on, we simply allow the current to run through the lamp. When the switch is off, the current does not run through the lamp, for there is a space between the metal wires that carry it. When we turn the switch on, we make the connection between the wire in the wall and the wire that runs to the lamp. When the current runs through the lamp it meets with a certain amount of resistance from the thin wire in the lamp, and the electric current, in forcing its way through the circuit, makes this wire so hot that it glows.

We know that we cannot get something out of nothing, and what happens here is that part of the electricity is changed into the heat that makes the thread inside the lamp glow. The greater the flow of electricity, the hotter and brighter the wire thread gets, and the more electricity is used up. If there were air in the lamp, the thread would burn away in a moment; but the lamps are so made that there is almost no air at all inside them. If we break the glass of the lamp and admit the air, the thread will burn and snap in a moment when we turn the current on.

WHY DO OUR HANDS KEEP DRY WHEN DIPPED IN QUICKSILVER?

Mercury, or quicksilver, is a true liquid, as water is, and it can flow as water can, if the conditions are right. When we dip our hands in water and withdraw them, the water clings to the skin and wets the hands. There is sufficient attraction between the water and the surface of the hands to make this possible; though, even in the case of water, it all depends on circumstances. For instance, we may coat our hands thickly in oil. Then we find that the attraction between the water and the oil is so small that our hands are not wetted, or scarcely wetted at all. Mercury behaves to the hand in its ordinary state as water does to the oil-covered hand. Also, mercury is a very heavy thing, and tends to fall back when the hand is withdrawn. Even when the hand is perfectly clean it is still much more oily than we think, for the skin of the hand actually produces oil to some extent. But if we use something that is *quite* free from oil, we can sometimes get mercury to flow over it and wet it in just the same way as water would.

WHY CAN WE PUT OUT A CANDLE BY BLOWING?

The candle, like a fire, goes on burning after it is lighted because it produces heat enough to warm the stuff of which it is made up to the temperature at which it combines with oxygen. The wax of the candle is made into gases by the heat, and these hot gases are burned with the oxygen of the air. If we blow out the candle, we blow away the hot gases with our breath, and though our breath is warm, it is not nearly warm enough to keep the candle alight. What really happens is that by blowing we lower the temperature of the candle to a point below that at which the stuff of the candle and the oxygen of the air are capable of combining with each other. If you will always keep in your mind this explanation of what burning is, it will help you to understand many things.

DO WE ALWAYS WAKE WHEN WE HAVE HAD ENOUGH SLEEP?

This is an important question, because the answer to it must decide one of the most essential points in taking care of children. The view used to be held that children were naturally lazy and naughty, and that nature had done things so badly that, to give the children a chance, it was necessary for grown-up people to interfere with everything that little ones inclined to do. On this theory the children were awakened at a fixed hour, as if all children required the same amount of sleep, as if the same child always required the same amount of sleep every night, and as if all sleep gave the same benefit, and could be measured by hours. This was wrong.

People who have given their lives to studying the subject are certain that a child will wake when its brain has had all the sleep it needs. The waking is the proper fruit of the sleep. A child could not sleep too long, because, directly sleep has done its work, the brain must wake; that is what sleep is for. On the other hand, the slightest noise may awaken children before they have had their sleep out. It is only a few children that get all the sleep that nature asks for them, and some people believe that a large number of these children will afterward become the leaders of their generation.

WHY IS THE TONGUE OF A MOTH SO LONG?

The tongues of some moths and butterflies are as long as their bodies. This is a wonderful adaptation of nature, enabling the insect to obtain its food from what would, without the long tongue, be an inaccessible position.

The nectar, which is the food of the butterflies and moths in question, is produced in the deep, hidden nectaries of flowers, and by unrolling the tongue and thrusting it down into the far recesses of the flower the insect is able to reach the nectar and suck it up.

This long tube has been developed in the course of ages from the jaws of the creature. Each jaw is drawn out into a long thread-like body, convex on the outer surface and concave on the inner side. Together they form a tube admirably suited for their purpose, and even the nectar in the very long narrow bells of some flowers is within reach of the long tongue.

When at rest the tongue is coiled up spirally like the mainspring of a watch, but it is always ready and can be shot out in an instant.

The adaptation of the insect to the flower also works the other way, and in the course of ages the flower has been adapting its form to the creature with the long tongue; for, while it gives up nectar to the insect, it requires a service in return. It is by these insects that the plant is pollinated to produce seeds that will carry on the race for another generation.

In seeking the nectar the insect collects pollen from the stamens of one flower, and when it goes to another flower the pollen on its body is rubbed off on the pistil, so fertilizing it.

It is the best adapted types of insects and flowers that have survived in the struggle for life. They have handed down their peculiar formations to their successors, and by continual selection these useful formations—such as the long tongue—have been more and more improved.

WHY DOES NOT THE WATER FALL OUT OF A REVOLVING PAIL?

We must remember that every substance, whether solid or liquid, tends to remain in the same position unless some force is applied to move it. The force of gravity keeps the water in the bucket when the bucket is at rest, and attracts both the bucket and the water to the earth. When we swing the bucket over our heads, gravity would cause the water to fall out if we held the bucket still, or moved it only slowly, but by keeping it moving quickly we bring other forces into action which act in other directions, and tend to make the water press against the sides of the bucket.

If the water could get out, it would not fall straight down to the earth, but would go on some distance in the direction in which the bucket was moving at the time.

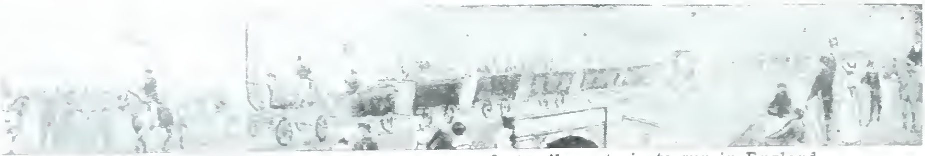
So that the water stays in the bucket as the result of the several different forces acting on it while it is being swung quickly round and round.

WHY DOES MILK TURN SOUR IN A THUNDERSTORM?

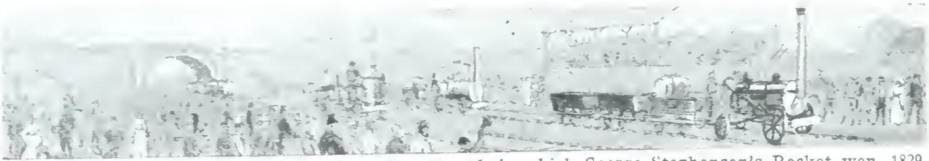
There is something in the state of the air in thundery weather which affects the milk, and this it does whether we happen to hear thunder or not. The air in thundery weather is charged with electricity, and it is also, as a rule, very moist and warm. These conditions favor the growth of bacteria which turn the milk sour, though we do not know exactly how or why.

THE NEXT WONDER QUESTIONS ARE ON PAGE 1749.

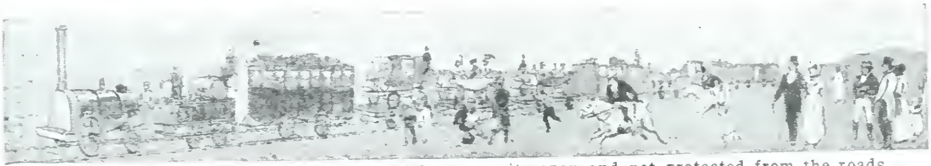
THE FIRST TRAINS TO RUN IN ENGLAND



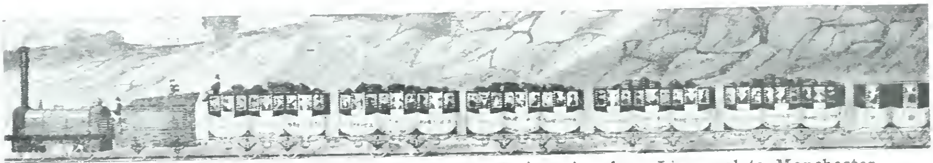
A man on horseback riding in front of the first railway train to run in England.



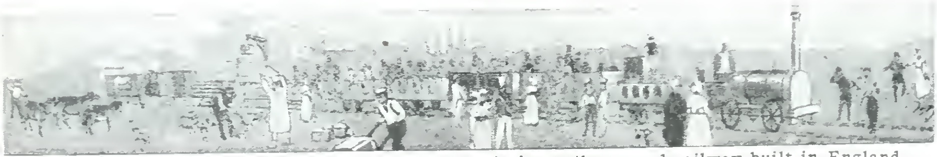
A race of railway engines at Rainhill, near Liverpool, in which George Stephenson's Rocket won, 1829.



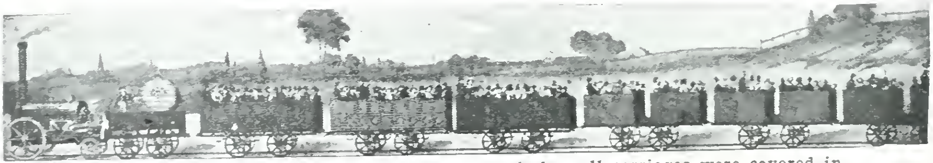
A scene on one of the first railways, which were quite open and not protected from the roads.



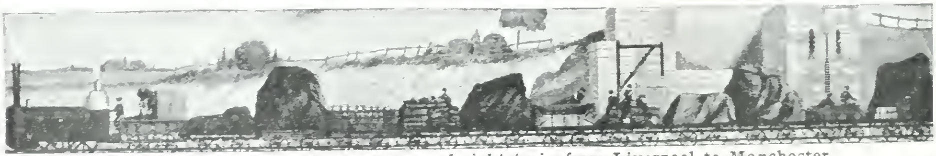
How first-class passengers traveled years ago: a train going from Liverpool to Manchester.



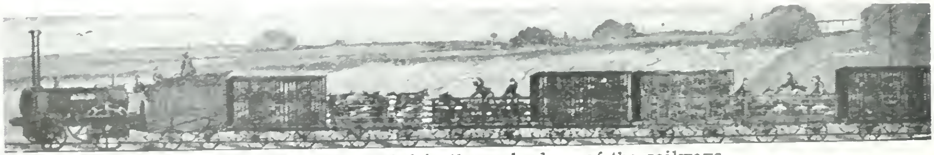
How second-class passengers traveled years ago: a train on the second railway built in England.



How third-class passengers traveled years ago before all carriages were covered in.

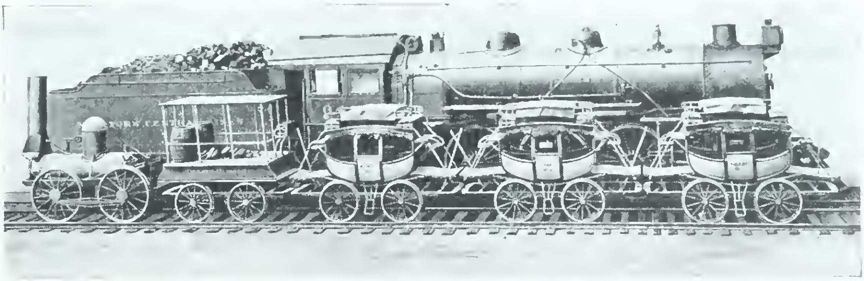


How goods were carried years ago: a freight train from Liverpool to Manchester.



How cattle were carried in the early days of the railways.

SOME OLD PICTURES OF THE EARLIEST RAILWAYS BUILT IN ENGLAND



Photo, New York Central Railroad.
The De Witt Clinton, of 1831, and its coaches compared with a modern passenger locomotive.

MEN WHO MADE THE RAILWAYS

SUPPOSE, when you want to go to the seaside or to visit your friends in the country, that there should be no railway to the place. "Such a thing could not be," you think; "there are railways everywhere about the country." You cannot think of a place where there are not railways somewhere near, can you? Well, whenever you hear to-day of anybody being more than a hundred years old, you may think to yourself, "That is somebody who was born when there were no railways anywhere in the world."

The first real railway was opened on September 27, 1825. Until then, people traveled as they had traveled for thousands of years. They had to ride on horseback, or in coaches, or else they had to walk. It used to take as long to get from New York to Boston as it now takes us to get from Toronto to Vancouver. People, on setting out, used to say, "This is a very long journey which I have to make, and I may never return, so I had better make my will before I go."

They thought they were almost flying if the coach went along at the rate of ten miles an hour. Once, when a great judge was going from Edinburgh to London, he thought that he would ride in the coach which, by having fast horses ready to meet it at different villages all along the way to London, would travel the whole journey at the rate of ten miles an hour.

"Oh, don't go by that coach!" said one of his friends.

"But I must," he said.

"Well, if you do, be sure not to go straight through; rest for a day or two at York," said the friend.

"Why should I do that?" asked the judge.

"Well," said the other man, "the rate at which it travels is so great that if you go all the way by that coach it will force the blood up into your head, and you will die. Either go by a coach which is not so terribly swift, or promise me that you will rest at York."

What would he have said if they had told him that the time would come when men and women and children, riding in express trains, would think nothing of traveling at the rate of sixty or seventy miles an hour? He would have thought the person telling him that had gone mad, would he not?

What one man, more than anyone else, brought about this great change in traveling? It was George Stephenson, once one of the poorest boys you ever heard of.

He was born on June 9, 1781, in a little village near Newcastle-on-Tyne. There were five other children in the family. These, with George and his father and mother, made up a household of eight all together. Their father, Robert Stephenson, though he worked very hard as a miner, and afterward as a fireman for an engine which dragged coal up out of the pit, earned so little money that he and his wife and all their children had to live in a tiny cottage. But cramped space need not limit thought, and sometimes a humble spot houses a great mind.

HOW GEORGE STEPHENSON BEGAN TO THINK WHILE WORKING AT A COAL-PIT

Children did not have to go to school in those days if their parents did not wish it; poor people's children hardly ever did go, and George Stephenson was like the rest of them. As a child, he used to run about the village, instead of learning lessons; then, when he got a little bigger, he set out to earn money by looking after cows. Afterward he took care of a horse which was kept at the colliery where Robert Stephenson worked.

But, though the boy did not go to school, he was clever. He used to make little clay models of the engine at the colliery, and he got to know so much about the engine that he was employed to look after one which pumped water out of a coal-pit. He loved this work. But he wanted to know more about the engine than he already knew. He could see for himself what there was to be seen, but he wanted to know *why* the fire in the furnace caused the water in the boiler to change into steam, and why the steam was able to drive the engine. He could not understand these things, for all that he wished to know was written in books which he could not read. To be able to read seemed to him the most wonderful thing in the world.

THE MEN WHO HAD BEEN THINKING ABOUT STEAM BEFORE GEORGE STEPHENSON

He knew that if he could learn to read he would be able to learn the secrets of steam-engines such as had then been built. Stephenson himself did not invent the steam-engine, for there was one already in use at the colliery when he first went to work.

From the time of Hero, a Greek, 130 years before Christ, men had been trying to make use of steam. Men in France and men in England had tried. Each in his turn did a little better than the others, until at last Thomas Newcomen, a blacksmith, who was born in 1663 and died in 1729, made a steam-engine which pumped water out of the mines.

This was a wonderful engine, considering that it was one of the first; but of course, it was far from perfect. One time, when a model of Newcomen's engine was sent to be repaired, a young man named James Watt was put to work on it. This was in 1765, when Watt was twenty-nine. He easily did what was wanted to make the model work, but he saw that the Newcomen engine wasted nearly all its steam. Watt, who was a very clever man, thought long over this, and in 1769 he invented an engine of his own, which was far better than Newcomen's—stronger, and not wasting so much steam.

Then Watt and a man named Matthew Boulton became partners at Birmingham, and made many engines on the plan of Watt's. These pumped water, but they were fixed; they could not move about. Watt knew all about the science of steam-engines, but poor George Stephenson did not.

THE GREAT GIANT THAT DASHED THROUGH THE LANES AT NIGHT

William Murdock, the man who found out the way to make gas from coal, also knew the secret, and made a toy steam-engine which ran on wheels. Murdock had a friend named Richard Trevithick, who did better than this. Trevithick, who was born in Cornwall in 1771 and died in 1833, made a steam-engine in 1801 which would travel along the road.

One dark night he and a friend, when out for a ride on the engine, dashed up to a toll-gate. The toll-keeper came out to take the money for their toll, but when he saw the engine spouting steam and sparks, he was so frightened that he could not speak.

"How much have we to pay?" Trevithick asked him.

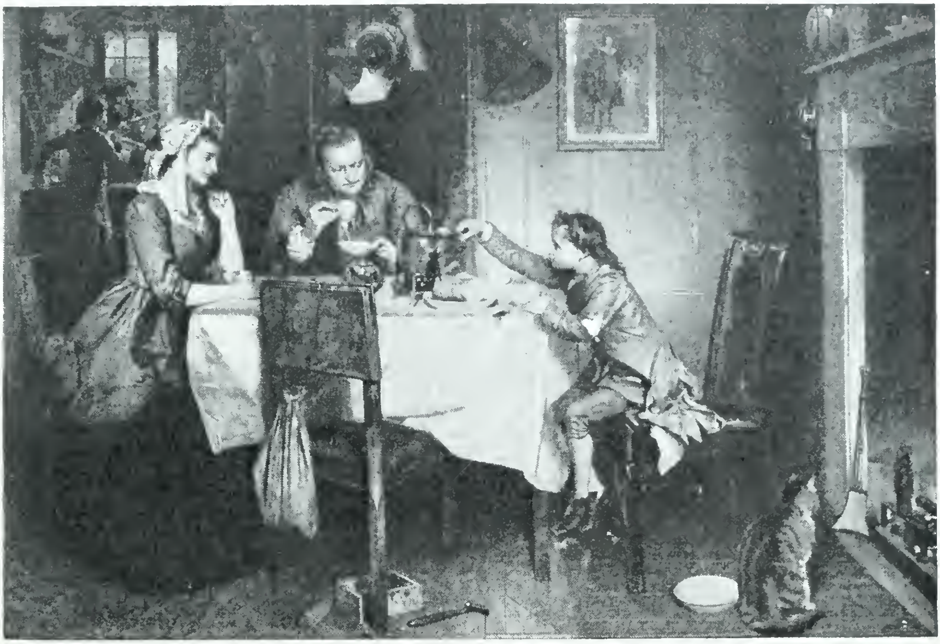
The poor man was in too much fear to answer, so Trevithick asked him a second time.

The toll-keeper flung open the gates. "N-nothing to pay—nothing to pay—please pass on as quickly as you can," he said.

He thought that Trevithick and his friend were two evil spirits, and that the steam-engine was the carriage which evil spirits used.

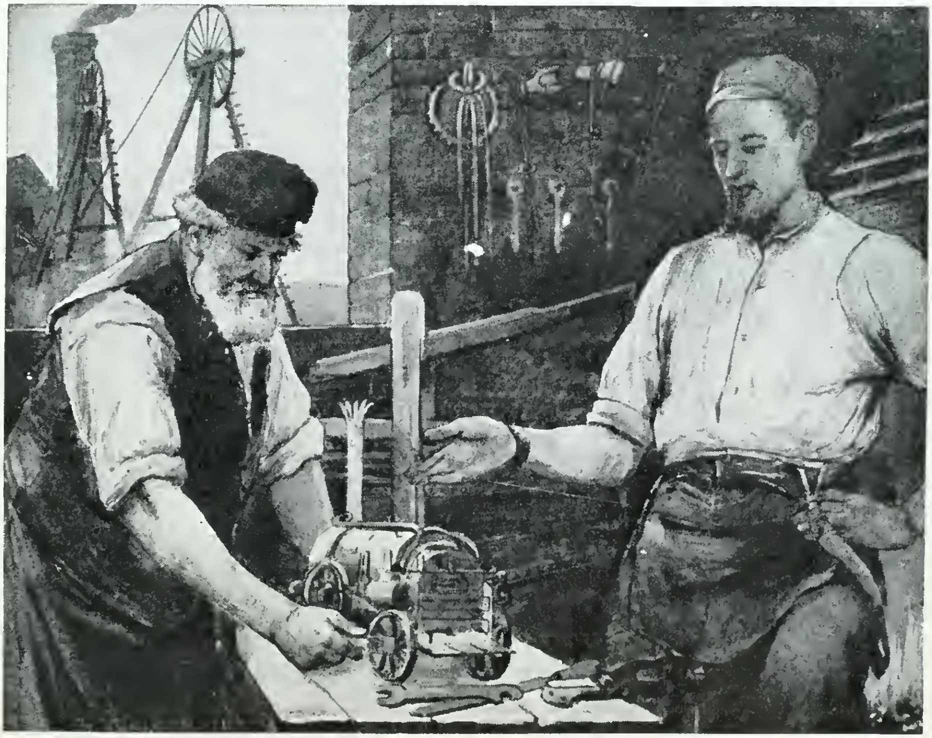
Trevithick made the first steam-carriage that ever ran upon a railway. When that was made George Stephenson was about twenty-three years of age. He had then got a situation in which his wages seemed to him a fortune.

THE MEN WHO MADE THE FIRST ENGINES



From the picture by Marcus Stone, R.A., published by Messrs. Hy. Graves & Co.

James Watt, though a delicate boy, loved problems and thought hard. This picture shows him watching steam lift a kettle's lid. When he was a man he invented the modern steam-engine.



George Stephenson loved engines. By making models and using his eyes and ears intelligently, he mastered engine craft before he learned to read. Here he and an assistant are working on a model.

STEPHENSON LEARNED HIS A B C WHILE INVENTING THE RAILWAY ENGINE

"Now I am made for life," he had said, a few years before, when he was earning twelve shillings a week. But still he did not even know his letters. So he made up his mind, big as he was, to go to school and learn to read and write, to do as a young man what every child in the land can now do.

He had to begin at the very beginning to learn how to read and how to do the simplest sums. He did not mind that. Although he worked hard at his engine from early morning till evening, at night he gladly ran off to his school to do his lessons. He soon learned, because he had made up his mind that nothing should stop him.

Having learned to read and write and do sums, he could now read and understand the wonderful books which told him what was known about the making and working of steam-engines. While other young men were wasting their time George was working at his engine or at his books. When not doing that, he would be mending boots. He mended boots so that he might have a little more money; for he had fallen in love with a pretty country girl, and she had promised to marry him as soon as they could save up enough money with which to furnish a little house.

They did save up and get married. They had a nice little two-roomed cottage of their own, and a baby boy was sent to make them still happier.

THE GREAT SORROW THAT CAME INTO GEORGE STEPHENSON'S LIFE

But great sorrow came to poor George. His wife died. So he went to work in Scotland, walking all the way to Montrose. He stayed there for a year, and saved $140. But he loved his baby too much to be longer away. The boy had been left at home, so Stephenson felt that he must go back. The man who was afterward to give the world its railways came back from Scotland in the same way that he had gone there—he walked all the way.

When he got home, he found that an accident had made his poor father blind, so George had now to keep his mother and father, as well as himself and his little child. He had a hard time of it. The army wanted him to go to be a soldier, and he had to give up all his little savings and run into debt, to be allowed to stay at home and work for his child and his parents. His troubles were so great that he shed tears, and thought that it was of no use trying to live in England, that he really must go to America, where so many other people were going. What a difference it would have made if he had gone! They would have had no railways in England for years and years.

Stephenson was not the man to sit weeping. He got better work, this time at Killingworth colliery, some little distance away from his old home. At this colliery they had a steam-engine working to pump away the water which leaked into the pit. The engine worked so poorly that it could not pump quickly enough. For more than a year it had been at work, but the pit was still full of water. Stephenson asked to be allowed to try what he could do. They laughed at the idea of his succeeding where better men, as they were supposed to be, had failed. Still, his masters let him have his way.

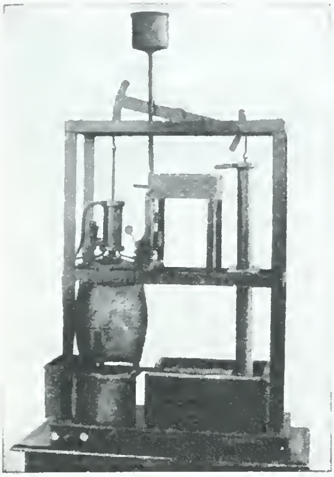
THE FIRST RAILWAY ENGINE RAN AT THE BOTTOM OF A COAL-PIT

He took the engine to pieces, he altered one or two parts, and then set it going. In two days it had pumped all the pit dry. That was a great thing for George. His employers saw that he was a great deal more clever than the rest of their men; so they gave him charge of all the machinery at the colliery, and paid him five hundred dollars a year. He still worked away at his studies, but there was new work for him to do at the colliery.

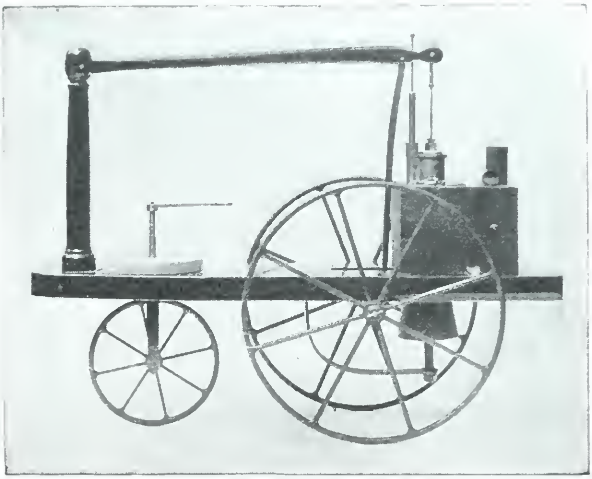
This work was to build a steam-engine to run on rails in the pit, and draw the coal from where it was dug out to the bottom of the shaft, where it had to come up to the surface. So the first railway on which his steam-engine ran began at the bottom of a coal-pit.

There had been rails there before, but the trucks of coal had been drawn over the rails by horses. So well did the engine work that, instead of a hundred horses, only fifteen were now required. It was only a little engine, and not a very good one, so he built others, each one being better than the last. He found time to do other things, too. His little boy was now growing up, so George, who still needed more money than he earned by his day's work, used to clean and mend clocks at night, in order that he might

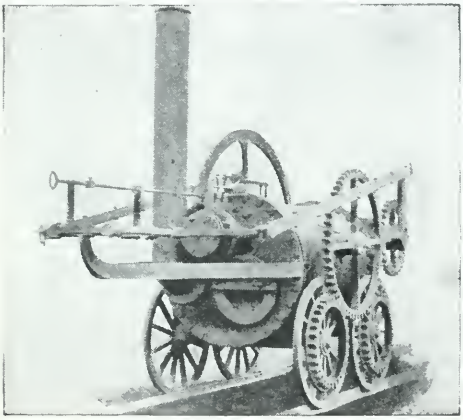
THE FIRST ENGINES AND THE FIRST RAILWAY



In 1765 James Watt was asked to repair this model engine, and in doing so found a way to make a better one.

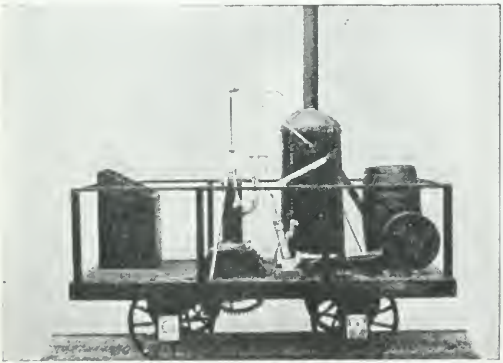


This was the first locomotive engine ever made in England, and was constructed by William Murdock, the man who found out the way to make gas out of coal. It was only a little toy model.

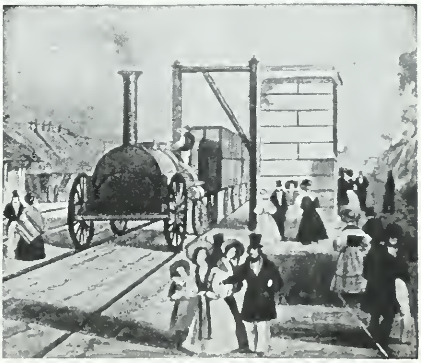


The first steam-engine that ran along the road was made in 1800 by Richard Trevithick in Cornwall. It frightened people, who thought it an evil spirit.

The Rocket was one of the first engines that ran on a railway from one town to another. It was made by George Stephenson, and drew a thirteen-ton load.



This engine, the Tom Thumb, was the first one made in America. It was built by Peter Cooper and could pull forty people eighteen miles an hour. It ran on the Baltimore and Ohio Railroad in 1830.



This was the second railway ever made, and was constructed by George Stephenson. There were no station platforms, and the trains seem very small and slow to us now.

send the child to a good school. Little Robert, who was very much like his father, was a remarkable student at school, and what he learned by day he used to teach his father at night. In time he became a great man, and helped his father in his work, and built engines and railways.

A SAFETY-LAMP FOR THE MEN IN THE MINES, AND THE FIRST RAILWAY

Besides making engines and mending boots and clocks, and learning from books, George Stephenson also made a famous safety-lamp. At that time men had to work in the mines with candles to lighten the darkness. Dangerous gas often escapes into the pit, and when this happened in those days, the gas, meeting the flame of the candle, used to explode, killing many men and wrecking the mine. Stephenson tried and tried until he was able to make a lamp which would not explode. This was of such value that kind friends made him a present of $5,000.

He was now becoming famous, and the owner of another colliery engaged him to build engines for him. George made five engines, each of which could draw a load of sixty-four tons along the rails.

When George Stephenson was forty years old, a gentleman named Edward Pease made up his mind to build a railway from Stockton to Darlington. He meant to have the trains drawn by horses, but Stephenson went to him and asked if he might build engines to draw them. Mr. Pease was surprised at the suggestion; but he went to see George's engines at work and said that he would have one for his railway.

A MAN ON HORSEBACK RODE IN FRONT OF THE FIRST TRAIN

So George left the colliery forever, and set to work to have the rails laid and to build his engine. He spent his $5,000 to help in starting a business to build engines and railway trucks, and from this workshop came the first engine to draw a train.

The work was finished by Tuesday, September 27, 1825, and thousands of people were at Stockton to see the train start. They thought that the thing would be a failure and wanted to enjoy the fun. But there was no failure. The train, made up of six small cars carrying coal and flour, and one coach for passengers, moved off with George himself driving the engine.

A man on horseback rode in front of the train, waving a great flag. He thought that he would be able to lead it all the way, that the train would never go fast enough to pass him. But presently George made a signal to him to get out of the way, and set the train going at fifteen miles an hour, although the weight which the little engine drew was nearly ninety tons.

It was a happy moment for Stephenson when the train reached Darlington without accident. The train was unloaded, then started back, carrying only passengers. When Stockton was reached, it was found that about 600 people were riding in or hanging on to the trucks of the little train.

THE WISE MEN WHO THOUGHT THE TRAINS WOULD BLOW UP

That was the first time in the history of the world that a steam-engine had drawn a train carrying passengers over a railway, and the man to do it all was the poor boy of other days who had been glad to earn pennies by minding cows, and to learn his A B C while other young men of his age were wasting their time in drinking-places.

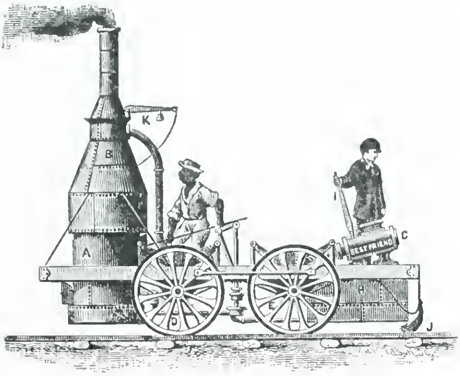
Of course, after this, Stephenson became very famous. He was at once called upon to build a railway between Liverpool and Manchester.

He was not afraid of the work, though he had many trials. First of all, the consent of Parliament had to be gained before the railway could be built; and the silliest things were said against the work. Great men declared that the engines would burst and blow the trains and the passengers to pieces, or that, if they did not do this, they would set the countryside on fire; or that their smoke would poison all the cows and pigs and hens, and all the birds would drop dead as they flew over the railways.

The papers were as bad as the people. They all wrote against Stephenson and his works.

"You might as well expect people to let themselves be fired off on rockets as trust themselves to steam-engines and railways." That is what one of the papers said at the time. But it was not very long before people did trust themselves to railways. Stephenson, remembering this talk about rockets, called his first engine for the Manchester and Liverpool railway the "Rocket."

A HALF-CENTURY IN AMERICAN LOCOMOTIVES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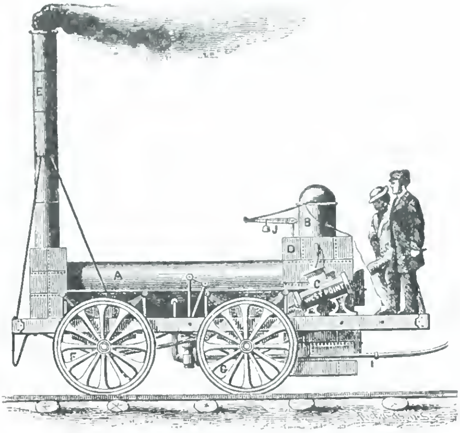
BEST FRIEND

THE BEST FRIEND—1830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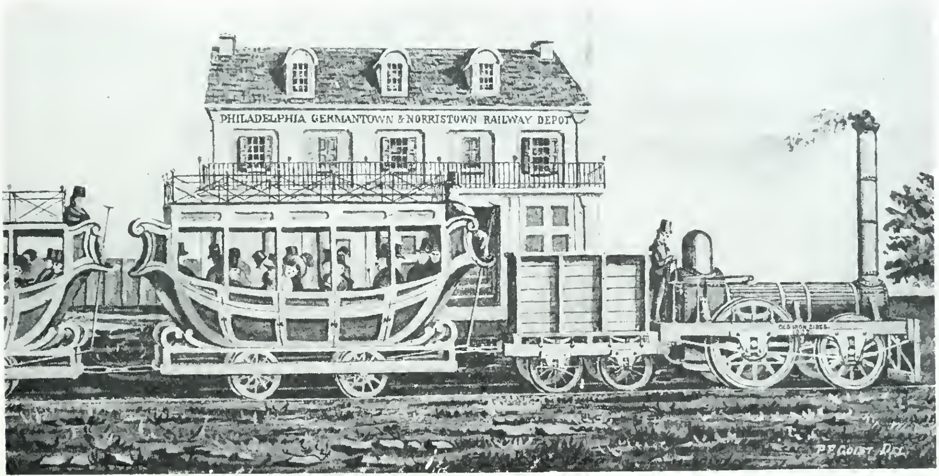
THE WEST POINT—1831


PHILADELPHIA GERMANTOWN & NORRISTOWN RAILWAY DEPOT
OLD IRON SIDES
P.F.GOLDT DEL.

OLD IRONSIDES WITH TENDER AND COACHES—1832

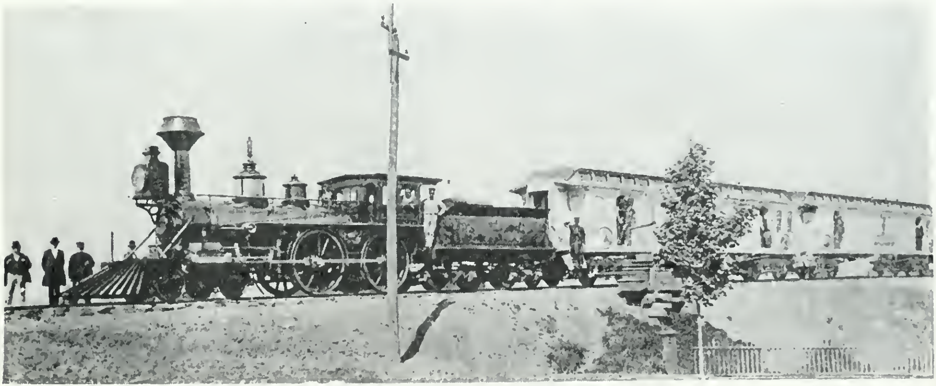


Photo Underwood & Underwood, N. Y.

THE FAST MAIL OF THE '80'S

The Best Friend and the West Point were made in New York in 1830 and 1831. Old Ironsides was built by Matthias Baldwin, of Philadelphia, in 1832. The lowest picture shows a locomotive of fifty years later—engine number 317, the J. H. Devereaux, of the Lake Shore and Michigan Southern Railroad.

THE LITTLE ENGINE THAT STARTED THE WORLD'S RAILWAYS

For the opening of that railway, several engines were sent. The company promised $2,500 reward to the man who made the best engine for their work. When all was ready, there was a public trial of the engines. The others were not nearly so good as George's splendid little Rocket. They broke down on the run, or could not go fast enough. His did all that was required to win the prize. It had been built at his own works, and his joy was very great because his son Robert had made the improvements which enabled it to gain the prize. The Rocket drew a load of thirteen tons at as high a speed as twenty-nine miles an hour.

It was only a little engine drawing a little train on quite a small railway, but that was the day of small things. Little beginnings may have great endings. From that time George Stephenson became gradually richer and richer. His son worked with him. They made engines for all parts of England, for railways which they built.

THE POOR BOY'S ENGINES WERE ORDERED BY KINGS

Foreign kings asked their advice about railway building or sent for them to come and build the railways. From George Stephenson's works engines went to all parts of Europe. He made a fortune, and lived to see his son even more successful than he had been. They never forgot that they had been poor, but helped others who were as poor as they had been, and did great good all the rest of their lives.

Since that day many men have carried on the work of building railways. Isambard Kingdom Brunel, who built all the bridges and tunnels on the Great Western Railway in England, helped his father to make the famous Thames Tunnel. In boring their way they found that the earth and water would rush in, so the younger Brunel invented a wonderful shield. He had watched little worms at work in the water, and had seen one make its way into timber. As it ate its way into the wood, it built round itself a tube, which became hard like lime, and so made a safe path for itself. And Brunel did something like that for his father's tunnel. He made a tube of steel, which was driven into the earth, and so kept the sides from tumbling in. Then between the tube and the earth above he forced in cement, which set as hard as rock. Had he not learned this secret from the worm, he could never have made his tunnel, and perhaps the tunnels under the Hudson River might not have been built.

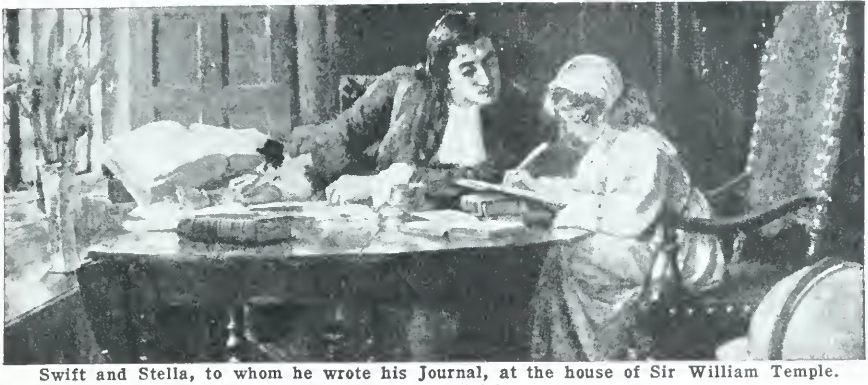
ENGINES THAT RAN IN THE UNITED STATES IN EARLY DAYS

The United States was not far behind England in building railroads, and the need was greater because of the longer distances. Several engines were ordered from England as soon as Stephenson's Rocket was seen to be a success. Some of them were the America, the Stourbridge Lion and the John Bull. The America, built by George Stephenson, came first, arriving in New York in January, 1829; but the Stourbridge Lion was the first steam locomotive of really practical use that ran in America.

The first of all the American-built locomotives was the Tom Thumb, which was constructed by Peter Cooper for the Baltimore and Ohio Railroad and began to run in 1830. It was so tiny that it was little more than a toy, and makes us laugh to look at it. Still it could run eighteen miles an hour, while pulling forty persons. Soon the Best Friend was built in New York for the South Carolina Railroad. Then the De Witt Clinton was made, to travel over part of the road now known as the New York Central and Hudson River Railroad. It with its coaches can still be seen at the Grand Central Station in New York.

But the real beginning of the manufacture of locomotives was in 1832, when Matthias Baldwin, of Philadelphia, built the Ironsides; the business which he started has grown until it is one of the largest in the world. The engines have increased and increased in size, in weight and in pulling power. The first ones made weighed from four to six tons, while now many an engine weighs fifty times as much and can pull a load of thousands of tons at a good rate of speed. Compare the early models pictured here with the monsters which run on the Western railways, of which pictures are shown on pages 416 and 417. These great engines, drawing much longer trains, have required much heavier rails and better roadbeds. The heavy steel rails of to-day carry a load which would have crushed the rails of the early days.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 1735.



Swift and Stella, to whom he wrote his Journal, at the house of Sir William Temple.
By Margaret Dicksee.

SWIFT, ADDISON AND STEELE

WHILE Alexander Pope was using his skill to make the writing of English poetry regular in form, and so far succeeding as to influence the poets of the next half century or more, two or three of his friends were bringing English prose nearer perfection than it had ever been.

Between poetry and prose in our language there is this difference in growth. Poetry reached its choicest forms almost suddenly, the best writing days of Shakespeare and Milton coming within sixty years; but prose, which seems so much easier, was far longer growing up.

It is true that in the prose of Malory and the Bible and John Bunyan we have a delightful simplicity, clear and sweet, and readily expanding into beauty and dignity. In Milton we have gorgeous eloquence, and in Defoe we have a clearness of statement that instantly convinces us. But there are other qualities in writing that will suit other needs, as, for example, keen and swift power when some wrong or folly calls for exposure, or graceful elegance when lighter topics have to be handled in the right manner.

These last features of style in prose-writing were brought into our literature at the beginning of the eighteenth century by Jonathan Swift, Sir Richard Steele, and Joseph Addison, Swift wielding the biting sword, and Steele and Addison supplying the taste and polish suitable for lighter subjects. With Addison more particularly, prose-writing became graceful.

It is not advisable that any of us should try to write as one or other of these masters of English prose wrote, for each of us must make his own style to suit his own thoughts; but we should know how they wrote, and what elements of usefulness, power or grace they brought into the language. Such knowledge helps us to know whether we are succeeding or failing in writing good English.

Jonathan Swift's life was embittered by what he regarded as failure. It is kind to suppose that mental disease was threatening him and influencing him from the first. At last he died insane. His cleverness was brilliant and enormous, and he knew it. If judged by his intellect alone, he would vie with the greatest.

As a matter of fact, Swift did become a very great power, through his influence over men who ruled; but he never attained the positions he coveted. So his heart grew cankered, and he died only an Irish dean.

Some of us may already have read Gulliver's Travels. Swift was a great writer of satire. Now, to be satirical one has always to be looking for the faults of others, and that is not the way that leads us to the love of our fellow-men. Swift spoke very bitterly of most people, and on the whole was not a very agreeable companion. But, for all that, he was a remarkable man, full of imagination, a great writer and, in short, what we call "a genius."

THE LIFE OF JONATHAN SWIFT, WHO WROTE GULLIVER'S TRAVELS

Jonathan Swift was born in the city of Dublin on November 30, 1667. His parents were of good family, but his father died before Jonathan was born, and his mother was left very poor.

He must have been a winning little boy, this fatherless Jonathan, for his nurse loved him so much that she took him away with her when she went to live at Whitehaven, and kept him for three years. So well had she looked after him and guided his infant mind that when he was again restored to his mother he was quite the cleverest little boy one could imagine. Before he was five years old, we are told, he was able to read any chapter in the Bible.

As Jonathan's mother had relatives of rank and wealth, he was not without help when he needed it, and the lad was sent to Dublin University at fourteen years of age and later to Oxford. There is nothing that one can say in favor of his university days. He seems to have been, on the whole, a very bad student.

When he was twenty-seven years of age he became a clergyman in Ireland, and except for some four years he continued to discharge the duties of a clergyman to the end of his life.

THE CLOUDED LIFE OF THE MAN WHO MADE THE WHOLE WORLD LAUGH

It was in April, 1713, that Swift was appointed Dean of St. Patrick's, Dublin, and thirteen years later he wrote Gulliver's Travels. More than twenty years before that he had written two famous books, The Tale of a Tub and The Battle of the Books.

The romance of his life was connected with a lady called Stella, whom he had known as a very young girl. Meeting her later when she had grown into a graceful young woman, he fell in love with her. He wrote many letters to her, and one of the books by which he ranks high as an author is his Journal to Stella, in which his genuine love for the lady is most charmingly displayed.

Many other books he wrote besides those familiar to us—histories, political studies, poems. But while we cannot help admiring the great cleverness of the man, or enjoying to the full the playfulness of his genius in such a work as Gulliver's Travels, we do not feel him to be so warm a human being as good John Bunyan. It is sad to think that his later years were clouded with the fear of madness; that, ten years after he had displayed so much mirth and playfulness in the story of Gulliver, he began to be so gloomy in his own mind that for the nine remaining years of his life he was often a stranger to happiness. He died in 1745, and was buried in the Cathedral of St. Patrick's, Dublin.

TWO GREAT ESSAY-WRITERS OF THE EIGHTEENTH CENTURY

In what is known as the "essay," or the writing of short and pleasing discourses on almost any sort of subject, there are two names which always come uppermost when we think of the English authors who have excelled in this form of literature. Addison and Steele were friends and fellow-workers during a great part of their lives, though unhappily they quarreled at the end.

It would be difficult to find two men more unlike each other, and it was perhaps just because they were so different that they so long succeeded in working together, as people seem most ready to admire in their friends the qualities they themselves do not possess. Certainly it was due to Addison and Steele that a considerable amount of delightful work was added to English literature. They were by no means the originators of the essay, as a hundred years before them the great English statesman and scholar, Sir Francis Bacon, afterward Lord Verulam, had written many essays which are justly considered among the classic treasures of our language. Bacon lived in the great age of Shakespeare, when the English tongue had just changed from its older form into what we call "modern English," although it still retained some quaint words and curious phrases of the old-fashioned speech. But by the end of the seventeenth century, when Addison and Steele flourished, it had shaped itself very closely to the educated speech of our own time, though many words were still pronounced differently, as indeed the language is constantly changing, enriching itself with new words to express new ideas and changing old words into new meanings.

The seventeenth century, and more particularly the eighteenth, were periods of history in which the English people were more formal and pompous in their manners than they are to-day, with the result that their written speech took on a certain stiffness and strove always to be "elegant," just as though a person were always dressed up for some ceremony and never knew the delight of taking one's ease in old clothes. We can see this as we read the essays of Addison and Steele. They are full of stately phrases and courtly compliments and bows. Their writers are always bent on showing us how well-bred are their manners. There is just a suspicion that they are looking in their mirrors, and are much pleased with themselves. They wrote long before the days of the modern newspaper, whose purpose is to chronicle the events of the fleeting hour, to record the history of the world from day to day. People were not in a hurry then; telegraphs, telephones and railway trains were still undiscovered secrets.

THE FAMOUS JOURNALS IN WHICH THE GREAT ESSAYISTS WROTE

But Addison and Steele set themselves to entertain and instruct their countrymen by writing on all sorts of subjects, and printing their essays in periodical form. Thus The Tatler, first issued on April 12, 1709, was quite a tiny sheet, published three times a week at one penny. In all, two hundred and seventy-one numbers appeared, of which Steele wrote one hundred and eighty-eight, while Addison wrote only about forty, but joined with Steele in writing about thirty-five of the issues. The remainder were from other pens. A feature of The Tatler had been an imaginary club of gentlemen known as the "Spectator Club"; and two months after The Tatler came to an end, The Spectator, on very similar lines, was started as a daily paper, Addison writing no less than two hundred and seventy-four numbers. The Spectator ceased on December 6, 1712, after five hundred and fifty-five numbers had appeared; but two years later it was resumed again, and eighty more numbers of the famous paper were published. For this last volume Steele appears not to have written at all, and Addison only a small fraction.

HOW ADDISON AND STEELE SPOKE TO THE PEOPLE OF THEIR DAY

It is very difficult for us to-day to realize how much the writings of these men in the papers mentioned affected the life of their time. This was really the first great triumph of the printing-press. None of the famous novelists who afterward arose to enthrall the public with their stories had yet given evidence of their powers. Books were by no means numerous, newspapers were still in their infancy; but here, in those little printed sheets, were men of great intelligence speaking to their fellow-countrymen every day, writing them letters, as it were, full of wisdom and wit and shrewd observation. They were, in a sense, great preachers, and these little papers were their pulpits, from which they addressed immensely greater congregations than ever any preacher, before the days of radio, could reach with the spoken word. And to-day the essays in The Spectator and The Tatler are still read and influence the thoughts of their readers two centuries after they were written.

Joseph Addison was born on May 1, 1672, the son of a poor clergyman who afterward became Dean of Lichfield. Both he and Steele were scholars together at the famous Charterhouse School in London. Addison afterward distinguished himself at Oxford, and had the luck to write some verses in praise of the king which secured him a pension of $1,500 a year, and enabled him to travel on the Continent and continue his education. But when King William died, the poet lost his pension and knew the pinch of poverty for a time until, with an eye to further profit, he wrote another poem celebrating the victory of Blenheim and praising the great military hero Marlborough.

THE END OF JOSEPH ADDISON'S HONORED AND USEFUL LIFE

This was more than generously rewarded by the gift of an official appointment, whence he rose to be one of the principal secretaries of state. Those were the days when the two great political parties were known as Whigs and Tories. Addison supported the former and devoted his pen to their service; and if he made good profit out of his politics, receiving a splendid pension when he retired, a year before his death, we need grudge him nothing that he earned, as his services to literature were far beyond the rewards of mere money.

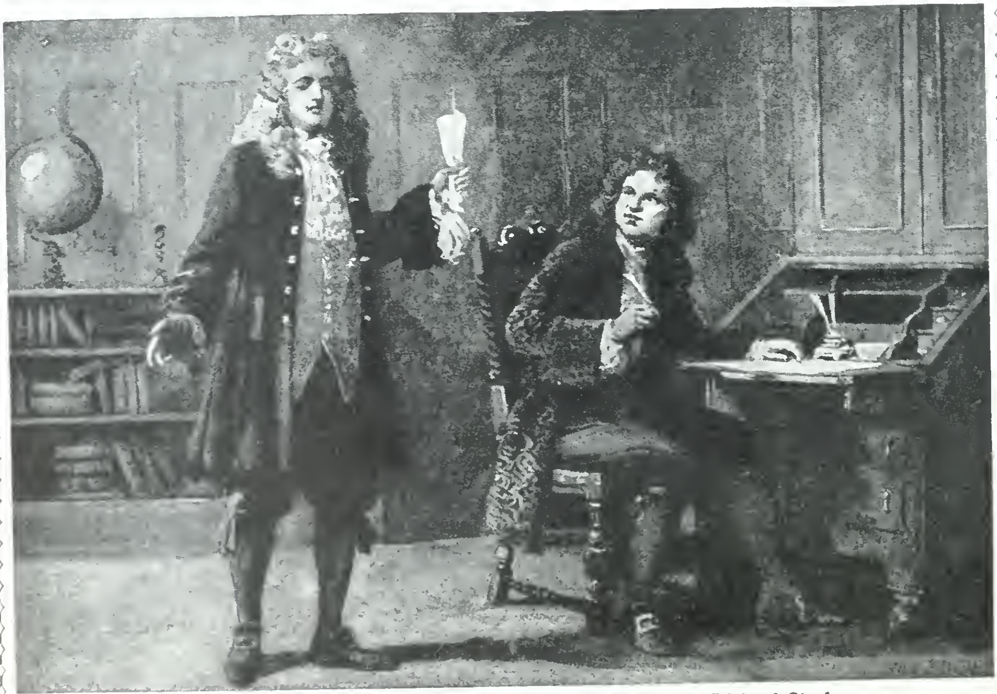
Like many other famous men, it is said that he was not happy in his marriage. His wife was the Dowager Countess of Warwick, and in the later years of his life his happiest days were spent in meeting his old friends at a London tavern. He was only forty-seven when he died, on June 17, 1719, and on his deathbed he said to his stepson: "See how a Christian can die."

His friend, Richard Steele, was a rollicking Irishman, born, it is said, on March 12, 1672, though some authorities maintain that he was three years younger than Addison. Thackeray says of him: "I am afraid no good report could be given by his masters and ushers of that thick-set, square-faced, black-eyed, soft-hearted little Irish boy. He was whipped deservedly a great number of times. Though he had very good parts of his own, he got other boys to do his lessons for him, and only took just as much trouble as should enable him to scuffle through his exercises, and by good fortune escape the flogging-block."

THE UPS AND DOWNS OF RICHARD STEELE, THE FRIEND OF ADDISON

He went to Oxford, but left the university without taking a degree and went into the army as a trooper. By taking this step he lost an estate which his uncle refused to leave him. His colonel, however, found out his capacity, made him his secretary, and got him a commission. By and by, he wrote a book, The Christian Hero, at which his fellow-officers laughed, but which attracted the attention of King William III. Then he tried his hand at writing for the stage; but he soon abandoned dramatic authorship, and we next hear of him, in 1706, as gentleman-waiter to Prince George of Denmark. His affairs prospered for a time, and from 1709 onward he was pouring out those brilliant essays for The Tatler. He became a member of parliament, but was expelled for writing in favor of the House of Hanover. On the death of Queen Anne, however, when the Hanoverian King George I came to the throne, he was rewarded with an official post. But he was by nature improvident and careless, and was always in difficulties. Toward the end of his life he lived in Wales, where he died in 1729.

THE NEXT STORY OF LITERATURE IS ON PAGE 1727.



Joseph Addison dictates one of his essays to his great friend Richard Steele.

Nearly all the necessities and luxuries shown in this room come from plants.

HOW PLANTS SERVE MANKIND

THE circle of human life runs into that of many different kinds of plants. The relations between the two worlds are manifold, as is plain when we think of wheat, bananas, grapes, olives, cotton, flax, palms, oak, tea, coffee, quinine, mushrooms, yeast and bacteria. Plants and animals and men have become closely intertwined in the web of life.

A general survey of the world shows four great vegetations—the treeless barren grounds of the North; the great zone of pine woods; the dry grasslands, or steppes; and the steamy tropical forests.

Now, it was in transition areas between these great vegetations that man was most successful in his task of cultivation, especially in the eastern end of the Mediterranean area, the Far East and the warmer parts of America. Those places were best where the natural vegetation was not too dense, and where, in the course of the year, there was considerable variation in the rainfall or in the temperature, or in both. For most cultivated plants flourish best when the seasons are well marked.

Among the food-plants the first place must be given to the cereals, like wheat, oats, barley and rye, which originated from wild grasses. Another very important cereal is rice, which requires abundant water when it is young and a good deal of warmth. It grows well in places that can be flooded or irrigated, as in the basin of the Ganges; and, though its cultivation demands much work, this is compensated for by its quick growth and its enormous yield. Rice is a difficult plant to grow, and the cultivators have to stand a great deal in the water; but two crops can be raised in a year in warm countries. Rice-fields often bring dense population.

Then there is maize, or Indian corn, which grows so well in many countries, and has been greatly improved by cultivation. A less valuable cereal is millet, important as a foodstuff in Africa and India, but it does not store well.

The sowing of wheat began many thousands of years ago, as we may infer from the little stores found in ancient lake-dwellings and the like; but it must be noted that some of the lowest existing races know nothing about sowing and reaping. The use of fruits and roots is older than all sowing.

When Australia was discovered there were no cultivated plants anywhere on that great island-continent, and the question rises what the natives found to eat. There were some birds and mammals which the clever hunters could kill, but they must have often been hungry. We must suppose that the women collected leaves and fruits and seeds and roots which could be eaten. Very important among the roots were the yams, twining plants related to daffodils and snowdrops, but with thick fleshy roots, and rich in good food.

THE MEMBER OF A POISONOUS FAMILY VALUABLE AS FOOD

Of course, it would take primitive man a long time to discover what roots, leaves, fruits and seeds he could safely eat; and then it would probably take him a long time to understand that he must not uproot *all* the yams or gather *all* the seeds if he wished to get more at the same place next year. But the big fact is that before agriculture men used things as they were.

Beside yams must be ranked ordinary potatoes, which flourish well in cool climates and store up large quantities of starch in the swollen portions of underground stem which we call tubers. As these tubers bear buds, or "eyes," they cannot be regarded as roots. It is interesting to notice that the potato belongs to a poisonous order—that of the deadly nightshade. The fruits are poisonous, and the tubers become dangerous if they are allowed to "green." Of great value are the rather mysterious life-saving substances called *vitamins,* which are found just under the skin of the potato. If we are to make the most of potatoes, we should have them cooked with their skins on, and not overheated. Otherwise we lose the vitamins.

THE UNDERGROUND STOREHOUSES OF STARCH AND SUGAR

Among the other important root-plants which man uses as food are carrots and turnips, parsnips and artichokes, sweet potatoes (belonging to the Convolvulus Family), and the yams of warm countries. In many cases, like the yams, it is all-important that the roots should be cooked before they are eaten. Another instance of this is the manioc of Brazil and other countries, which furnishes tapioca. It is a vigorous shrub belonging to the Spurge Family, and very poisonous. The fleshy roots are carefully scraped, and the interior is crushed into flour, which is baked in thin layers to drive off the poison. It will be understood that the roots of plants are useful to man because they are particularly rich in starch and sugar, which the plant stores as capital for next year.

One of the plants which feeds many people is the banana. It is an Eastern forest plant, with a strong stem bearing enormous leaves, which often get torn into strips by the wind and rain. From among the leaves there hangs down a huge bunch of perhaps hundreds of fruits, and the stem is cut down to get the bananas. The wild bananas of the East have large bitter seeds and rather tasteless pulp, but in remote antiquity man cultivated the banana plant with patience till he reared a stock without seeds and with palatable flesh. The fruit is really a long berry, and it was apparently in its improved seedless state that it was brought to Africa and other countries—a godsend to the natives.

With a little care the banana plant can be got to bear fruit all the year round, and it is easily propagated by sticking into the soil the shoots which spring up around the base of the cut stem. As long as there is rain enough there is plenty to eat in a banana country, and no need to store or think of the morrow. But this is not good for man.

THE DATE-PALM AND ITS MANY USES FOR MANKIND

The sweet fruits that can be eaten raw are called bananas proper; those that are cooked in an unripe state are called plantains. They are steamed and mashed, then eaten with some flavoring of curry or meat-juice. Large quantities of plantains, however, are eaten raw by European populations. When we eat a sweet banana it is interesting to remember that the seeds of its ancestors and near relatives were once big and bitter.

Another of the great fruits of the world is produced by the date-palm, a native of north Africa, southwest Asia and part of India, and cultivated in many other countries. The fruits are very nutritious and can be stored in a dry state. Date-honey is squeezed out from the fruit and can be used as a starting-point for wine; palm-wine is also made from the sap; the bud forms palm-cabbage, the stones are ground to make a substitute for coffee and they also yield oil; the leaves are made into baskets and mats; the fibres are wound into string; the wood is used in building huts. Could there be a more useful tree?

There are two kinds of date-palm trees, wild ones that produce the fertilizing pollen, and cultivated ones that produce

THE WAVING PALMS OF TROPIC ISLES

The wonderful coconut-palm which provides man with material for making margarine, candles, medicine, soap, mats and several other useful things.

the fruit; and in very ancient times the Arabs and Assyrians were in the habit of tying the pollen-bearing flowers to the fruit-bearing flowers, knowing that this was necessary if the fruit was to form, but not understanding why. The custom was prohibited by Mohammed, and this led to the failure of the date-palms in the gardens of his followers. To check the consequences of this failure Mohammed issued another edict allowing true believers to pillage caravans, and this had far-reaching consequences. Here we have a strange example of the way in which man's treatment of plants may influence human history!

We cannot tell the story of the other important fruits, like the fig and the vine and the olive, which have been of such importance to Mediterranean peoples like the Greeks and the Romans. But it must be understood that all the great food-plants, whether fruits or roots, wheat or rice, have meant a great deal in the shaping of the civilizations which have grown up around them. This is not so plain today as it was long ago, for modern man is taking extraordinary pains to improve valuable food-plants and to establish them in new countries. The story of the introduction of date-palms and Smyrna figs into North America reads like a romance.

THE LUXURIES AND MEDICINES THAT MEN OBTAIN FROM PLANTS

We must not forget the almost necessary luxuries, like the tea, infused from the dried leathery leaves of an Indian or Chinese shrub; like coffee, made from the ground seeds or beans of a small evergreen tree, a native of the tropical mountainous districts of eastern Africa, but now cultivated in all warm countries; like cocoa and chocolate, made from the fermented and ground seeds of a small tree, originally a native of Mexico, but now widespread. And from the almost necessary luxuries we pass gradually to those that can be more easily dispensed with, such as spices, like cinnamon, and perfumes, like lavender.

From very ancient times there has been a widespread use of herbs as medicine, and the old doctors often collected medicinal plants for themselves or employed a humble herb-gatherer. There was a long-lasting belief that plants showed some evidence or "signature" of what they could cure; thus the throat-like corolla of the Canterbury bell was supposed to show that the plant was a cure for sore throats. This was, of course, sheer superstition, but many of the curing virtues of plants are real enough and have been proved by centuries of experiment. There may not be justification for all the common medical names of plants, like Heal-All, Lung-wort, Liver-wort, Bladder-wort, Spleen-wort, but there is no doubt that preparations of plants have lightened the burden of the ills our flesh is heir to. We need only mention quinine, strychnine, castor-oil, rhubarb, valerian, atropine and aloes. There seems even to be scientific authority for the use which some so-called savage tribes make of certain roots as a remedy for snake-bite.

HOW PLANTS HAVE PLAYED THEIR PART IN CLOTHING THE WORLD

It is probable that man's first clothing was the skin of some animal, but in warm countries the use of aprons of unplaited grass and reeds was doubtless very primitive. A sort of bark-cloth is still in use, as in the Pacific Islands. But gradually there came about a weaving of fibres into a fabric, which showed improvement after improvement as the centuries passed. The important vegetable fabrics are cotton, linen, ramie and jute. Silk must be placed by itself, for it is made out of the cocoon which the silkworm winds round itself as a protection during the period of the great change from caterpillar to moth.

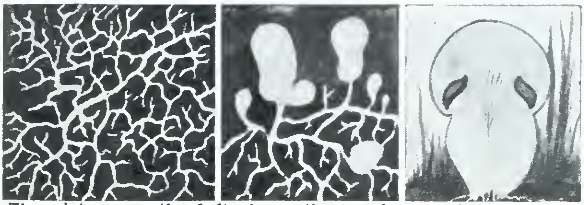
Cotton grows wild in many tropical countries. It is usually a low plant, but some species grow into small trees. In the tropics it is a perennial, but in the temperate zone, where it is chiefly cultivated, it is an annual plant. The fruit, or boll, is a box-fruit, packed tightly with fibres which adhere closely to the seeds.

THE MANY DIFFICULTIES FOUND IN GROWING COTTON

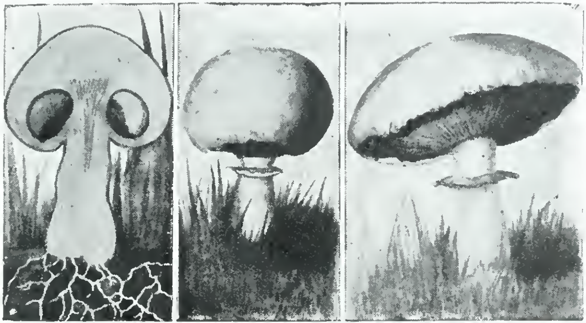
The southern states of the American Union produce the most cotton, though large quantities are grown in Egypt and India. Cotton is a difficult plant to grow. It requires careful cultivation, and has many insect-enemies, such as the cotton-worm and the boll-weevil. The latter insect pierces the unripe boll and lays its eggs. They hatch into grubs and destroy the growing fibre by feeding upon it. The boll drops off without ripening, and a large proportion of the crop may be lost.

When the cotton is ripe, it must be pulled from the open bolls by hand, but is separated from the seeds by a machine, the cotton-gin. The cultivation of cotton in the United States was one of the great reasons why negro slavery continued to exist so long. This is an example of the way in which man's relations to plants have influenced history.

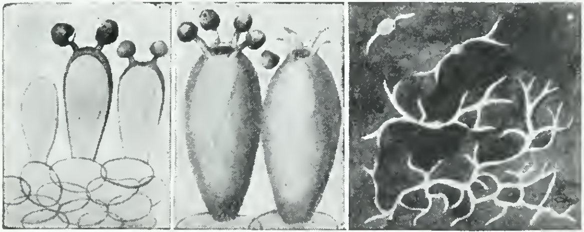
Flax has been cultivated since the dawn of history. It is an annual herb, a native of western Asia, with beautiful blue flowers. The strong outer fibres of the stem are woven into linen, and the seeds yield linseed oil. Ramie, or China grass, is a fibre obtained from a shrubby nettle; it is woven into a soft shining cloth, used in China for summer dresses. Jute-fibre is obtained from the inner bark of two Indian trees belonging to the lime-tree order; it is separated off the stem by rotting, is variously treated, and then spun; and it is finally woven into a multitude of useful fabrics, from soft goods to carpets.



The picture on the left shows the meadow mushroom spawn spread out in the soil where it grows; the middle picture shows the mushroom beginning; and the picture on the right shows the gills just forming.



Now the mushroom has grown, but the gills beneath the cap are not visible until the cap has burst, as seen in the centre picture. The picture on the right shows the fully grown mushroom, which is the fruit of the plant, and produces spores from which future mushrooms will grow.



The left and centre pictures here show highly magnified sections of part of the gills. The cells on the outside layer become enlarged into sacs and develop little stalks on which spores form. The ripened spores, falling from their stalks, throw out delicate threads till at last they form spawn, as seen in the first picture; and the cycle of life begins again.

THE LIFE-STORY OF A MUSHROOM

One cannot think of plants used for fabrics without remembering vegetable dyes such as natural indigo and madder.

It would take a great book to do anything like justice to the variety of ways in which plants have come to be of use to man. We have not had space to speak of the timber trees, out of which man has made boats and ships, huts and houses, fences and bridges. Or again, there is the importance of the ancient papyrus, which consisted of slices of the pithy stem of the paper reed, pressed, dried and smoothed. And what would the world be without paper—which the Chinese invented about the beginning of the Christian Era? It is a web formed of strands of vegetable fibre, first separated and then recombined.

The plants that mean most to man in a direct way are the flowering plants, but we cannot possibly pass over those plants that are flowerless, for the carboniferous flowerless plants formed the great part of the coal-beds of the earth—a store of energy that has meant so much to man. We remember also how much bog-moss meant to the wounded in the World War, and how important its great sponges are in keeping streams flowing in times of drought. Extract of the underground stem of the male fern is of some use in medicine; and the bracken is a serious enemy to the hill farmer, for it smothers both pasture and heather.

The importance of algæ for man is very largely indirect. Both in the sea and in the fresh waters the minute floating plants, such as diatoms, form a large percentage of the food of small crustaceans and the like, on which fishes in their turn depend. In shallow waters, where great fields of seaweeds grow on the rocks, there is a huge production of food for animals living near shore. Some browse on the fronds;

others depend on the sea-dust of fragments which the currents sweep down the slope. These banks of seaweed are often important in protecting the coast from the breakers, and what is tossed up on the beach may be carted to the fields as manure, or burned to ashes as kelp, from which iodine and soda may be prepared. Some seaweeds are eaten for the sake of their sugar; others yield a useful jelly; and a delicate food for invalids is made out of two weeds of the North Sea.

Here we may include the "double plants," or lichens—partnerships of an alga and a fungus—which have some importance as soil-makers and furnish food for the reindeer in the Far North. The "earth-bread" of the Tartars is made out of a lichen that incrusts the rocks of the deserts and the steppes; and the litmus paper continually used in chemical laboratories is also produced from a lichen.

THE FIERCE BATTLE THAT GOES ON BETWEEN MAN AND THE FUNGI

Everyone knows the blue-green or the black molds that grow on the surface of a pot of jam or on moist bread, and the number of molds is legion. Such a mold is simply fungus, consisting of a felt-work of branching threads and bearing spore-forming bodies of various kinds. These molds live on decaying matter, in fact, usually being the cause of the decay. They are sometimes of use, as in the case of the blue mold, which improves the quality of Gorgonzola cheese. But a fungus often feeds on living organic matter and does great damage, especially in warm and damp countries or among cultivated plants grown under crowded and sheltered conditions. Thus man's endeavors are sometimes defeated by *rust* on wheat, *smut* on oats, *mildew* on vines, *blight* and *wart* on potatoes, and so on through a long list.

On the profit side of the account are the palatable mushrooms, which feed on organic matter in the soil or in the artificial bed that man makes. In the case of certain relatives of mushrooms, when there is an exhaustion of the food-material in the soil of a particular spot on the turf, the fungus spreads outward and outward in a widening circle. The difference in the vigor of the grass inside and outside of the ring results in the appearance known as a "fairy ring." There are many different kinds of eatable mushrooms, including the palatable truffles.

THE WONDERFUL YEAST PLANT AND ITS WORK IN THE VINEYARDS

In the soil of vineyards there is always a tiny fungus—the yeast plant. It lives a very inactive life for most of the year, but when the grapes begin to ripen it has its day. Carried up by wind or insects, it settles on the grapes, and where a little wound has allowed the juice to ooze out it feeds and multiplies. The ground is restocked by fallen grapes or by the rain that washes the fruit. The grapes are crushed in the winepress; and in the vats into which the juice is poured there takes place the fermentation that changes the "must" into wine. The sugar is changed by the living yeast plant into alcohol and carbon dioxid. There are also by-products, some of which give the wine its flavor.

A similar process of fermentation occurs when the sugar of the sprouting barley (malt) is changed by the yeast plant into beer. In this brewing the yeast has to be added to the malt; it is not present from the first, as in the case of grapes. In ordinary baking, again, yeast is mixed with the dough, and left to "work" in a warm place. The yeast feeds on the flour, and fermentation occurs, forming a little alcohol and large quantities of carbon dioxid. The bubbles of the gas are caught in the dough and unite to form the little holes we see in light bread. "A little leaven leaveneth the lump."

The yeast plant consists of single cells, each about three-thousandths of an inch long; it is pressed into cakes for the market, and there are many different kinds known by different names.

THINGS OF BEAUTY MADE POSSIBLE BY BACTERIA

The smallest and simplest plants are the invisible bacteria which are found almost everywhere—in air, in water, in the soil, inside animals, in food. There is no rotting without bacteria and molds; and the manure the farmer puts on his fields to compensate for what the crops take out of the soil would be of no use unless the bacteria worked at it and made it available for the roots of plants. The dead bodies of animals and plants are reduced by bacteria to gases, water and salts, and so the soil is kept clean and at the same time enriched. The bacteria, as we have said before, are the middlemen between what is dead and what is living.

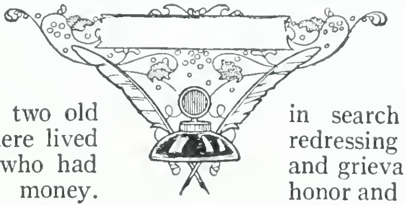
THE NEXT STORY OF PLANT LIFE IS ON PAGE 1755.

FAMOUS BOOKS

CERVANTES AND HIS BOOK

In the early years of the seventeenth century stories of the impossible deeds performed by wandering knights were almost the only books read in Spain, where lived the great author whom we call Cervantes. Cervantes decided to ridicule these absurd stories out of fashion; and so he wrote The Adventures of Don Quixote. The hero of the book is a kindly old gentleman whose head has been turned by reading trashy stories of knights and ladies fair. This story of his adventures is one of the greatest works in literature, for its abounding humor, its wisdom and its true humanity, as well as for its pictures of the life of Spain 300 years ago. Don Quixote, first published in 1605, remains one of the favorite books in the world's library.

ADVENTURES OF DON QUIXOTE



In a certain village of La Mancha, a territory which is partly in Arragon and partly in Castile, two old kingdoms of Spain, there lived an elderly gentleman who had big ideas but little money. His household consisted of a housekeeper, a niece and a man-of-all-work. Three-quarters of his income went on food, which was of the most humble kind. The rest was laid out on a plush coat and velvet breeches for holidays, and a suit of homespun for everyday use.

He was about fifty years old, of a hale and strong complexion, lean-bodied and thin-faced, an early riser, and a lover of hunting. He passed the greater part of his time in reading books about the doughty deeds performed by knights in the brave days of old. So absorbed did he become in these tales that he sold much of the land he owned in order that he might be able to buy the books.

He was so much loved and respected by those who knew him that his niece and his servants became alarmed at his odd behavior. His neighbors also were concerned for his welfare. For while the older books that he pored over were of value, he bought many that were quite worthless. And he grew so fascinated with them all that he was unable to tell the good from the bad.

At last he was convinced that the only course left open to him was to become a knight-errant himself. He decided to arm himself in the old-fashioned way, and to go out into the world in search of adventure. By redressing all manner of wrongs and grievances he hoped to win honor and renown. Full of this idea, he secured a suit of armor that had belonged to his great-grandfather and had for many years rusted in a corner of his house. When he had cleaned and repaired it as well as he could, he found that there was no visor to the helmet. So he made one of pasteboard. Then, being anxious to see if it was cutlass-proof, he drew his sword and tried its edge upon the pasteboard. At the very first stroke he undid in a moment what he had taken a whole week to complete.

Undaunted, however, by this disaster, he made another visor, strengthening this one with some thin plates of iron on the inside. Satisfied with his handiwork, he next thought of his horse.

In his stable was a sorry-looking animal, which, however, he was convinced would compare favorably with any of the famous steeds of which he had read. For four days he was at a loss for a name that would suit such a splendid creature. Don Quixote decided to call him Rozinante, meaning thereby a horse that, from being an ordinary animal, had become "second to none."

He decided that he himself would thenceforth be known as Don Quixote de la Mancha, in order to immortalize his native place. He thought that there was nothing wanting now but a lady upon whom he might, in the ancient manner, bestow the empire of his heart. "Should I," said he to himself, "chance to encounter some giant, and happen to lay him prostrate on the ground, transfixed with my lance, or cleft in two, or, in short, overcome him and have him at my mercy, would it not be proper to have some lady to whom I might send him as a trophy of my valor?"

Now, it chanced that there lived not far away a good-looking country lass whose name was Aldonza Lorenzo. He thought she would serve admirably, if she had but a name more like that of a princess or lady of quality. So he decided to call her Dulcinea, with the addition of "del Toboso," from the place where she was born. Thus provided with all that was necessary to his present way of thinking, he donned his armor, and one fine July morning mounted Rozinante and sallied forth secretly to meet his first adventure. As he rode along he was struck suddenly with the thought that he had never been "dubbed" or created a knight. Moreover, he remembered that until he had been dubbed a knight he could neither meet another knight in single combat nor wear dark armor. These thoughts at first shook his resolution, but he resolved that he would be dubbed a knight by the first he should meet, while he would scour his armor at leisure until it should look whiter than ermine. Thus fortified in his plan, he went on his way until evening drew on and he espied an inn. He put spurs to Rozinante and rode toward it.

HOW DON QUIXOTE BECAME A KNIGHT

BOTH Don Quixote and his steed were sorely in need of rest and refreshment when they came up to the inn. At the door stood two young women who were going to Seville with some carriers, all of whom were taking up their lodging for the night.

Now, our traveler no sooner saw the inn than he fancied it to be a castle, fenced with four towers, with lofty pinnacles glittering with silver, together with a deep moat, drawbridge, and all other devices peculiar to such strongholds. He thereupon halted, fully expecting that some dwarf would appear on the battlements and sound his trumpet to give notice of the arrival of a knight.

Just then a swineherd sounded a horn to call his pigs together from the stubblefield. Imagining this to be the expected signal, Don Quixote rode up to the entrance. At his approach the two young women started to run away in alarm. But Don Quixote, lifting up his visor and disclosing his withered, dusty face, accosted them, with comely grace, in this manner:

"Do not fly, ladies, I beseech you, nor fear the least offense. The order of knighthood, which I possess, forbids me to offer injuries to anyone. Least of all to damsels of such high rank as your presence denotes."

As the young women laughed outright at this, Don Quixote, speaking in a tone of grave reproof, observed that modesty and civility were very becoming in the fair sex, whereas laughter without sufficient reason was but foolishness. "But," added he, "I do not presume to say this to offend you. My only wish is to do you service."

This speech only increased the mirth of the young women. Our knight's anger was rising when the innkeeper luckily appeared, and holding the stirrup for Don Quixote to dismount, invited the latter to enter the inn and partake of such cheers as it afforded. Don Quixote, observing the humility of the governor of the castle—for such the innkeeper and the inn seemed to him to be—replied: "Señor Castellano, the least thing in the world suffices me. For arms are the only things I value, and combat is my bed of repose."

Having besought the innkeeper to look well to his steed, Don Quixote entered the inn, where, with the help of the two good-natured young women, he divested himself of his armor, with the exception of the helmet. This he had fastened on with ribbons. As these had become tangled and he would not allow them to be cut, he had to be fed by the young women and the landlord.

When he had partaken of his frugal meal in this awkward manner, he called his host to the stable. Here, falling down at his feet, Don Quixote declared he would not move until the governor had promised to dub him knight. All that night, he said, it was his intention to watch his armor in the chapel of the castle, so that the ceremony might take place in the morning. The innkeeper, who had a sense of humor, promised to do what was asked of him. But the worthy man said that, as the chapel had not yet been rebuilt, his noble guest might watch his armor just as well in the courtyard.

The host next asked Don Quixote if he had any money. On being told that he had not, the old fellow informed him that all knights should carry money and clean shirts. Don Quixote, having said that he would see to this in the future, took his armor into the courtyard, placed it in a dry horse-trough, and began his vigil. While he was so engaged, one of the carriers came out to water his mules. When Don Quixote saw this man approach the trough for the purpose of removing the armor, he cried out:

"O thou, whoever thou art, rash knight, that prepares to lay thy hands on the arms of the most valorous knight-errant that ever wore sword, take heed; do not attempt to profane them with a touch, lest instant death be the reward of thy temerity."

But the carrier paid no heed to this warning, and very promptly lifted the armor and threw it out of his way. On this, Don Quixote, calling upon his lady, Dulcinea, in knightly fashion, knocked over the carrier with a heavy blow from his lance. He restored the armor to its place, and marched backward and forward with as little concern as if nothing had happened.

Soon after, another carrier came out, and not noticing the form of his comrade on the ground also attempted to remove the armor. Don Quixote thereupon hit the man so heavily with his lance that his cry of alarm brought out the landlord and all the people of the inn. Very quickly Don Quixote was defending himself from a volley of stones. He had to shelter himself under his shield, calling out at the same time that they were false and treacherous villains, and that the lord of the castle was a base and inhospitable knight to suffer a knight-errant to be so abused. He carried himself at the same time with so much spirit as to strike fear into the hearts of his assailants, so that they yielded to the appeal of the landlord and stopped the attack.

But the landlord, anxious to be rid of so troublesome a guest, made apologies for the carriers, remarking that two hours' vigil was sufficient. As Don Quixote had been watching his armor for four hours, the ceremony of dubbing him a knight could now proceed. Don Quixote, believing him, asked him to make an end of the business as soon as possible. Further observing that the rest of the ceremony might be performed as well in a field as in a chapel or anywhere else, the landlord fetched his account-book. Calling upon the two young women previously mentioned, also a boy, whom he caused to hold a lighted candle, he asked Don Quixote to kneel.

Pretending to read from his book, the landlord lifted up his hand and gave Don Quixote a good blow on the neck with his hand, and a gentle slap on the back with the flat of his sword. He next ordered one of the women to gird the sword about the knight's waist. Her companion having buckled on his spurs, the knight thanked them all. Rozinante being brought forth, he rode away, the landlord being so glad to see him go that he did not ask for the reckoning.

Thus it was that Don Quixote de la Mancha was dubbed a knight.

DON QUIXOTE CHALLENGES THE MERCHANTS

THE adventures that befell Don Quixote soon after he left the inn were enough to damp the ardor of any ordinary knight-errant.

When he had arrived at a spot where four crossroads met he saw a party of merchants on their way to Murcia. Perceiving here the prospect of a new adventure, and resolved to imitate as much as possible the knightly prowess of which he had read in his books, he posted himself in the middle of the road. Then he called upon the advancing strangers to halt and declare that there was no other damsel in the world to equal "the Empress of La Mancha, the peerless Dulcinea del Toboso."

After some parley, and dissatisfied with the replies given to his demands, the knight couched his lance and rode furiously at one of the merchants. Had not Rozinante stumbled and fallen, the man would have paid dearly for his raillery. As it was, Don Quixote was so encumbered with the weight of his armor that he could not rise.

At this, one of the grooms, indignant at what he regarded as the insult offered to the merchant, his master, took the knight's lance, and breaking it into pieces, belabored him until he was tired out. At last the merchants pursued their journey, leaving Don Quixote powerless on the ground. Here he was found by a countryman, who, with no little difficulty, lifted the would-be gallant upon his donkey, and putting the armor on the back of Rozinante, led him home.

While Don Quixote was recovering from his injuries, his friends made a bonfire of all the rubbishy books in his library. By removing the cause of his craziness they hoped to restore the knignt to his former healthy state of mind. But at the end of a fortnight Don Quixote prepared to go forth again. Secretly he made all preparations.

This time he decided that he would have a squire. To this end he induced an honest but poor country laborer named Sancho Panza to go with him. He promised Sancho Panza that when opportunity offered he would make him the governor of some island. This prospect so dazzled the fancy of the stolid countryman that he saddled his donkey, Dapple, and joined the knight mounted on Rozinante. The two made such haste that one morning by break of day they had traveled so far as to believe themselves out of reach of pursuit by the friends who wished to stop them.

DON QUIXOTE AT THE WINDMILLS

WHILE Sancho was talking, as they went along, about the island he was going to govern—he was not quite sure, by the way, what an island was—they came to a plain on which were some thirty or forty windmills.

"Look yonder, friend Sancho!" cried the knight. "There are at least thirty outrageous giants whom I intend to encounter. Having deprived them of life, we will enrich ourselves with their spoils, for they are lawful prize."

Honest Sancho, who saw things as they were, endeavored to convince his master that the "giants" were really windmills. But Don Quixote, regarding this as a sign of magic, told Sancho to stand aside if he were afraid.

This said, he put spurs to Rozinante and cried out: "Stand, cowards! Be not so base as to fly before a single knight, who dares encounter you all!"

At this moment the wind arose, and and the mill-sails began to move.

"Base miscreants!" now cried Don Quixote. "Though you move more arms than the giant Briareus, you shall pay for your arrogance."

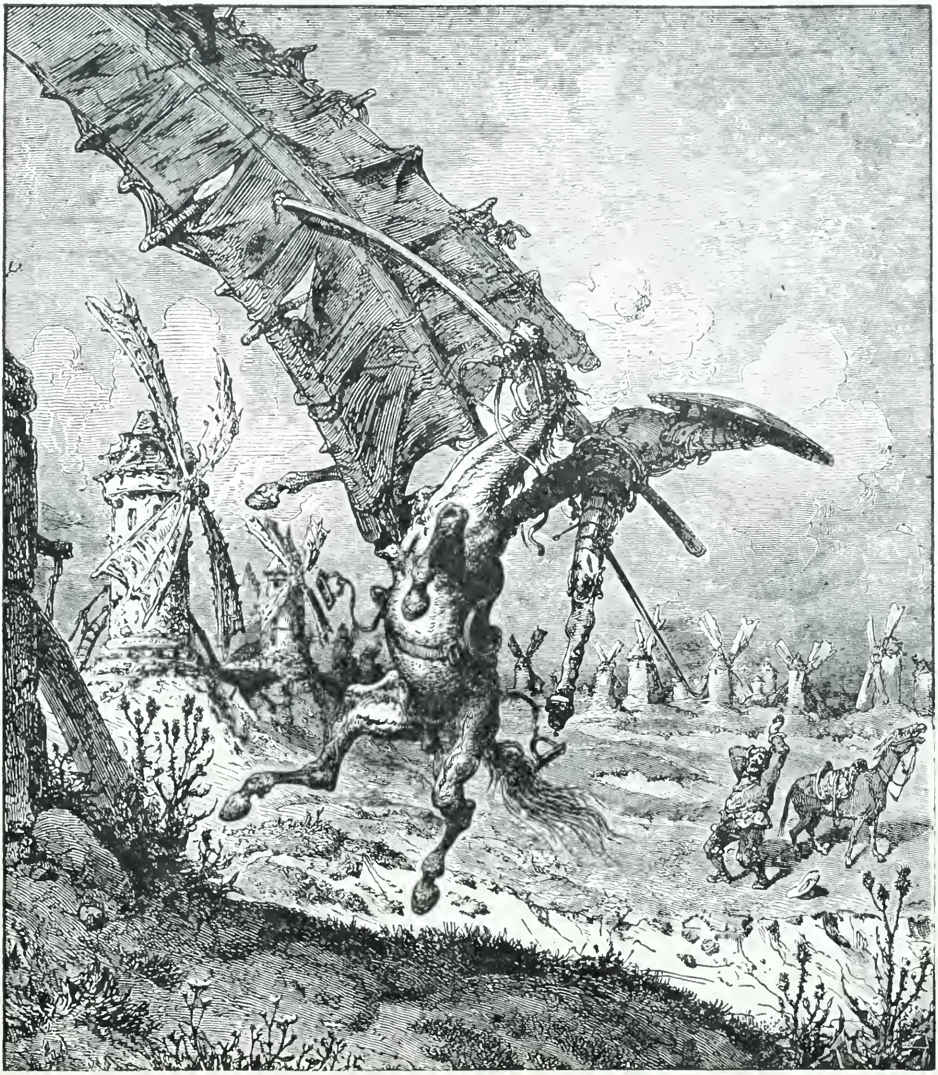
Calling upon his Lady Dulcinea, he couched his lance, and covering himself with his shield, dashed forward to the nearest windmill at the utmost speed of which Rozinante was capable. As he ran his lance into the sail, the wind whirled it about with such swiftness that the lance was shivered, and both knight and horse were hurled to the ground. As on the former occasion, the knight was again rendered powerless.

When Sancho ran up to him, Don Quixote declared that a wicked magician had transformed the giants into windmills, so as to deprive him of the honor of the victory. Don Quixote's next adventure was of a more dignified character. Engaging in single combat with a Biscayan, he had him at his mercy. He spared the man's life only when his lady promised that he should go to Toboso and present himself before the Lady Dulcinea, that she might dispose of him as she might think fit.

But not long after this, as the result of an encounter with a party of carriers, Don Quixote was seen riding in a limp condition on Dapple, while Rozinante carried his arms. Sancho Panza, also sorely bruised, was leading the way to an inn which Don Quixote declared was a castle. Here the knight's conduct caused much wonderment, but his wounds were attended to, as were those of his squire.

On being informed by the landlord at the moment of leaving that his imagined castle was but an inn, Don Quixote declared that as no knight-errant had ever been known to pay in such a place, neither would he. Thereupon he rode off. But Sancho Panza, who was behind, was seized and tossed in a blanket. The poor servant emerged from this adventure more wretched than his master, who, hear-

DON QUIXOTE TILTING AT THE WINDMILLS



ing his squire's cries, came back, but was unable to help him.

As they went on their way Don Quixote sought in vain to convince Sancho that those who had treated him so cruelly were but phantoms from another world.

"It is as plain as a nose on a man's face," declared Sancho ruefully, "that these adventures, which we hunt for up and down, are like to bring us at last into a peck of troubles. Our wisest course is to jog home and look after our harvest, lest worse mischief befall us."

"Poor Sancho," replied the knight: "how ignorant art thou in matters of chivalry! Come, say no more, but have patience. A day will come when you will be convinced how honorable a thing it is to follow this employment."

So, with reluctance, Sancho rode on with his master.

Soon after this Don Quixote performed a feat of valor which astonished all. He had been riding along conversing with a chance acquaintance when an adventure came to him.

We shall give the story in Cervantes' words.

THE ADVENTURE WITH THE LIONS

DON QUIXOTE, lifting up his eyes, perceived a waggon on the road, set round with little flags that appeared to be the king's colours: and believing it to be some new adventure, he called out to Sancho to bring him his helmet. Sancho, hearing him call aloud, left the shepherds, and clapping his heels vigorously to Dapple's sides, soon came trotting up to his master.

They were now overtaken by the waggon, which was attended only by the driver, mounted on one of the mules, and another man sat on the fore part of it. Don Quixote making up to them, "Whither go ye, friends?" said he. "What waggon is this? What do you convey in it? And what is the meaning of these colours?" "The waggon is mine," answered the waggoner: "I have there two brave lions, which the general of Oran is sending to the king, and these colours are to let the people understand that what goes here belongs to him." "Are the lions large?" "Very large," answered the man in the fore part of the waggon; "bigger never came from Africa. I am their keeper, and have had charge of several others, but I never saw the like of these before. In the foremost cage is a lion, and in the other a lioness. By this time they are cruelly hungry, for they have not eaten to-day; therefore, pray, good sir, ride out of the way, for we must make haste to get to the place where we are to feed them."

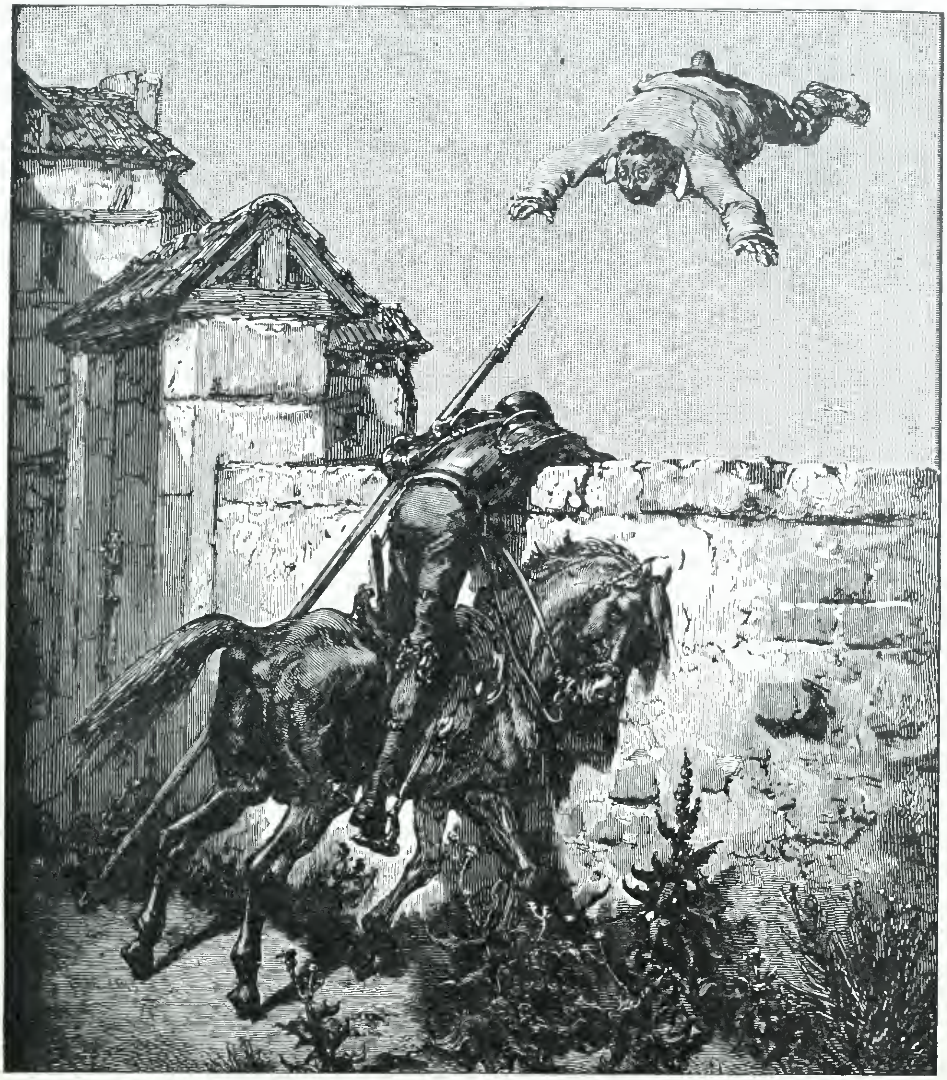
"What?" said Don Quixote, with a scornful smile; "lion whelps against me! And at this time of day? Well, I will make those gentlemen that sent their lions this way, know whether I am a man to be scared with lions. Get off, honest fellow; and since you are the keeper, open their cages and let them both out; for in despite of those enchanters that have sent them to try me, I will make the creatures know, in the midst of this very field, who Don Quixote de la Mancha is."

While he was making this speech, Sancho came up to Don Diego, and begged him to dissuade his master from his rash attempt. "Oh, good dear sir!" cried he, "for pity's sake hinder my master from falling upon these lions by all means, or we shall be torn in pieces." "Why," said the gentleman, "is your master so arrant a madman, then, that you should fear he would set upon such furious beasts?" "Ah, sir!" said Sancho, "he is not mad, but terribly venturesome." "Well," replied the gentleman, "I will take care there shall be no harm done;" and with that, coming up to the Don, who was urging the lion-keeper to open the cage, "Sir," said he, "knights-errant ought to engage in adventures from which there may be some hope of coming off with safety, but not in such as are altogether desperate; for courage which borders on temerity is more like madness than true fortitude. Besides, these lions are not come against you, but sent as a present to the king; and therefore it is not your duty to detain them, or stop the waggon."

"Pray, sweet sir," replied Don Quixote, "go and amuse yourself with your tame partridges and your ferrets and leave every one to his own business. This is mine, and I know best whether these worthy lions are sent against me or no." Then turning about to the keeper, "Sirrah!" said he, "open your cages immediately, or I will certainly pin thee to the waggon with this lance." "Good sir," cried the waggoner, seeing this strange apparition in armour so resolute, "for mercy's sake, do but let me take out my mules first, and get out of harm's way with them as fast as I can before the lions get out; for if they should once set upon the poor beasts, I should be undone for ever; for, alas, that cart and they are all I have in the world to get a living with." "Thou man of small faith," said Don Quixote, "take them out quickly then, and go with them where thou wilt; though thou shalt presently see that thy precaution was needless, and thou mightest have spared thy pains."

The waggoner on this made all the haste he could to take out his mules, while the keeper cried out, "Bear witness, all ye that are here present, that it is against my will that I open the cages and let loose the lions; and that I protest to this gentleman here, that he shall be answerable for all the mischief they may do; together with the loss of my salary and fees. And now, sirs, shift for yourselves as fast as you can, before I open the cages; for, as for myself, I know the lions will do me no harm." Once more the gentleman tried to dissuade Don Quixote from doing so mad a thing;

SANCHO PANZA TOSSED IN A BLANKET



telling him that he tempted Heaven in exposing himself without reason to so great a danger. To this Don Quixote made no other answer but that he knew what he had to do. "Consider, however, what you do," replied the gentleman; "for it is most certain that you are mistaken." "Well, sir," said Don Quixote, "if you care not to be spectator of an action which you think is likely to be a tragedy, put spurs to your mare and provide for your safety."

Sancho, hearing this, came up to his master with tears in his eyes, and begged him not to go about this fearful undertaking, to which the adventure of the windmills and the fulling-mills, and all the brunts he had ever borne in his life, were but children's play. "Good your worship," cried he, "do but mind; here is no enchantment in the case, nor anything like it. Alack-a-day, sir, I peeped even now through the grates of the cage, and I am sure I saw the claw of a true lion, and such a claw as makes me think the lion that owns it must be as big as a mountain." "Alas, poor fellow!" said Don Quixote, "thy fear will make him as big as half the world. Retire, Sancho, and leave me; and if I chance to fall here, thou knowest our old agreement; repair to Dulcinea—I say no more." To this he added some expressions which cut off all hopes of his giving over his mad design.

The gentleman in green would have opposed him, but considering the other much better armed, and that it was not prudence to encounter a madman, he even took the opportunity, while Don Quixote was storming at the keeper, to march off with his mare, as Sancho did with Dapple and the carter with his mules, every one making the best of his way to get as far as he could from the waggon, before the lions were let loose. Poor Sancho at the same time made sad lamentations for his master's death; for he gave him up for lost, not doubting that the lions had already got him in their clutches. He cursed his ill fortune, and the hour he came again to his service; but for all his wailing and lamenting, he urged on poor Dapple, to get as far as he could from the lions. The keeper, perceiving the persons who fled to be at a good distance, fell to arguing and entreating Don Quixote as he had done before. But the knight told him again that all his entreaties were but in vain, and bid him say no more, but immediately despatch.

Now while the keeper took time to open the foremost cage, Don Quixote stood debating with himself whether he had best make his attack on foot or on horseback; and upon mature deliberation he resolved to do it on foot, lest Rozinante, not used to lions, should be put into disorder. Accordingly, he quitted his horse, threw aside his lance, grasped his shield, and drew his sword; then advancing with a deliberate motion, and an undaunted heart, he posted himself just before the door of the cage, commending himself to Heaven, and afterwards to his lady.

The keeper observing that it was not possible for him to prevent letting out the lions without incurring the resentment of the desperate knight, set the door of the foremost cage wide open, where, as I have said, the lion lay, who appeared of a monstrous size and of a frightful aspect. The first thing he did was to turn himself round in his cage; in the next place he stretched out one of his paws, put forth his claws, and roused himself. After that he gaped and yawned for a good while, and shewed his dreadful fangs, and then thrust out half a yard of tongue, and with it licked the dust from his face. Having done this, he thrust his head quite out of the cage, and stared about with his eyes that looked like two live coals of fire; a sight and motion enough to have struck terror into temerity itself.

But Don Quixote only regarded it with attention, wishing his grim adversary would leap out of his hold, and come within his reach, that he might exercise his valour, and cut the monster piecemeal. To this height of extravagance had his folly transported him; but the generous lion, more gentle than arrogant, taking no notice of his vapouring and bravados, after he had looked about him awhile, turned his back upon the knight, and very contentedly lay down again in his apartment.

Don Quixote, seeing this, commanded the keeper to rouse him with his pole, and force him out, whether he would or no. "Not I, indeed, sir," answered the keeper; "I dare not do it for my life; for if I provoke him, I am sure to be the first he will tear to pieces. Let me advise you, sir, to be satisfied with your day's work. 'Tis as much as the bravest that wears a head can pretend to do. Then pray go no farther, I beseech you; the door stands open, the lion is at his choice whether he will come out or no. You have waited for him, you see he does not care to look you in the face; and since he did not come out at first, I dare engage he will not stir out this day. You have shewn enough the greatness of your courage; the scandal is his, the honour the challenger's."

"'Tis true," replied Don Quixote. "Come, shut the cage door, honest friend, and give me a certificate under thy hand, in the amplest form thou canst devise, of what thou hast seen me perform; while I make signs to those that ran away from us, and get them to come back, that they may have an account of this exploit from thy own mouth." The keeper obeyed; and Don Quixote, clapping a handkerchief on the point of his lance, waved it in the air, and called as loud as he was able to the fugitives, who fled nevertheless, looking behind them all the way, and trooped on in a body with the gentleman in green at the head of them.

At last Sancho observed the signal, and called out, "Hold! my master calls; I will be hanged, if he has not got the better of the lions!" At this they all faced about, and perceived Don Quixote flourishing his ensign; whereupon recovering a little from their fright, they leisurely rode back till they could plainly distinguish his voice. As soon as they were got near the waggon, "Come on, friend," said he to the carter; "put-to thy mules again, and pursue thy journey; and, Sancho, do thou give him two ducats for the lion-keeper and himself, to make them amends for the time I have detained them." "Ay, that I will with all my heart," quoth Sancho; "but what is become of the lions? Are they dead or alive?"

Then the keeper very formally related the whole action, not failing to exaggerate, to the best of his skill, Don Quixote's courage: how, at his sight alone, the lion was so terrified, that he neither would nor durst quit his stronghold, though for that end his cage-door was kept open for a considerable time; and how at length, upon his remonstrating to the knight, who would have had the lion forced out, that it was presuming too much upon Heaven, he had permitted, though with great reluctancy, that the lion should be shut up again. "Well, Sancho," said Don Quixote to his squire, "what dost thou think of this? Can enchantment prevail over true fortitude? No; these magicians may rob me of success, but never of my invincible greatness of mind."

Sancho gave the waggoner and the keeper the two pieces. The first harnessed his mules, and the last thanked Don Quixote for his bounty, and promised to acquaint the king himself with his heroic action when he went to court. "Well," said Don Quixote, "if his majesty should chance to inquire who the person was that did this thing, tell him it was the Knight of the Lions; a name I intend henceforth to take up, in place of that which I have hitherto borne; in which proceeding I do but conform to the ancient custom of knights-errant, who changed their names as often as they pleased."

Don Quixote now addressed Don Diego. "Without doubt, sir," said he, "you take me for a downright madman, and, indeed, my actions may seem to speak me no less. But for all that, give me leave to tell you, I am not so mad, nor is my understanding so defective, as you may fancy. Let me remind you that every knight has his particular employment. Let the courtier wait on the ladies; let him with splendid equipage adorn his prince's court, and with a magnificent table support poor gentlemen. Let him give birth to feasts and tournaments, and shew his grandeur, and liberality, and munificence, and especially his piety: in all these things he fulfils the duties of his station. But as for the knight-errant, let him search into all the corners of the world, enter into the most intricate labyrinths, and every hour be ready to attempt impossibility itself; let him in desolate winds baffle the rigour of the weather, the scorching heat of the sun's fiercest beams, and the inclemency of winds and snow; let lions never fright him, dragons daunt him, nor evil spirits deter him:—to go in quest of these,—to meet, to dare, to conflict, and to overcome them all,—is his principal and proper office. Well I know, that valour is a virtue situate between the two vicious extremes of cowardice and temerity. But certainly it is not so ill for a valiant man to rise to a degree of rashness as it is to fall short, and border upon cowardice. For as it is easier for a prodigal to become liberal than a miser, so it is easier for the hardy and rash person to be reduced to true bravery, than the coward ever to rise to that virtue. And therefore, in thus attempting adventures, believe me, Signor Don Diego, it is better to exceed the bounds a little, and overdo, rather than underdo the thing; because it sounds better in people's ears to hear it said, how that such a knight is rash and hardy, than such a knight is dastardly and timorous."

"All you have said and done," answered Don Diego, "is agreeable to the exactest rules of reason; and I believe if the laws and ordinances of knight-errantry were lost, they might be all recovered from you, your breast seeming to be the safe repository and archive where they are lodged. But it grows late; let us make a little more haste to get to our village and to my habitation, where you may rest yourself after the fatigues which doubtless you have sustained, if not in body, at least in mind, whose pains often afflict the body too." "Sir," answered Don Quixote, "I esteem your offer as a singular favour." And so proceeding a little faster than they had done before, about two in the afternoon they reached the village.

. . . .

With Don Quixote's decision we close the quotation from the book.

DON QUIXOTE AND THE CLOUDS OF DUST

As they continued on their way, they saw a thick cloud of dust arise before them.

"The day is now come," said Don Quixote, on seeing this. "The day is come, Sancho, that shall usher in the happiness that is in store for us. That cloud is raised by a great army on the march."

"Why, then," said Sancho, "there must be two armies, for yonder is as great a dust on the other side."

Don Quixote looked and was thereupon transported with joy. His imagination at once leaped to the conclusion that two vast armies were about to engage each other on the plain before them. So clouded was his brain that he could not see that the dust was raised by two flocks of sheep going in the same direction from different parts. The dust being so thick as to hide the cause of it, Sancho at first believed that what his master said was right.

"What shall we do?" he asked, in great alarm.

"Do?" exclaimed Don Quixote. "What but assist the weaker and injured side? The army, Sancho, which now moves toward us is commanded by the great Alifanfaron. The other is his enemy, the King of the famous Garamantians, Pentapolin with the naked arm, so called because he always enters into battle with his right arm bare."

Recalling what he had read from foolish books, Don Quixote proceeded to describe to his squire the causes of the quarrel. At this point they mounted a hillock, from which Sancho, to his amazement, could only see the sheep, which were being driven along by some peaceful countrymen.

"Why," said he, "you might as well tell me that it snows. Not a man, nor a knight, nor a giant such as you name, can I see, but only sheep."

"Dost thou not hear their horses neigh, their trumpets sound, and their drums beat?" asked the knight.

"Not I," replied Sancho; "I can hear nothing but the bleating of sheep." The two flocks were now very near to them.

"Thy fears disturb thy senses," said Don Quixote, "and hinder thee from hearing and seeing right. But since thou art so terrified, withdraw to some place of safety, for I alone am sufficient to give the victory to that side which I shall favor." And so couching his lance, setting spurs to Rozinante, and heedless of what Sancho Panza said, Don Quixote rushed forward upon the sheep.

"Courage, brave knights," cried he, laying about him with all the vigor possible, "fall on, all of you who fight under the standard of the valiant Pentapolin. Follow me, and you shall see how easily I shall revenge him on that infidel Alifanfaron."

Seeing what destruction the knight was causing, the shepherds and drovers who were with the sheep called out to him to desist. Finding that their cries were of no avail, they proceeded to unloose their slings and to ply him with showers of stones as big as their fists. Don Quixote only laid about him with greater energy, until one of the stones struck him so violently in the face that it knocked out several of his teeth and caused him to fall heavily to the ground and lose his senses.

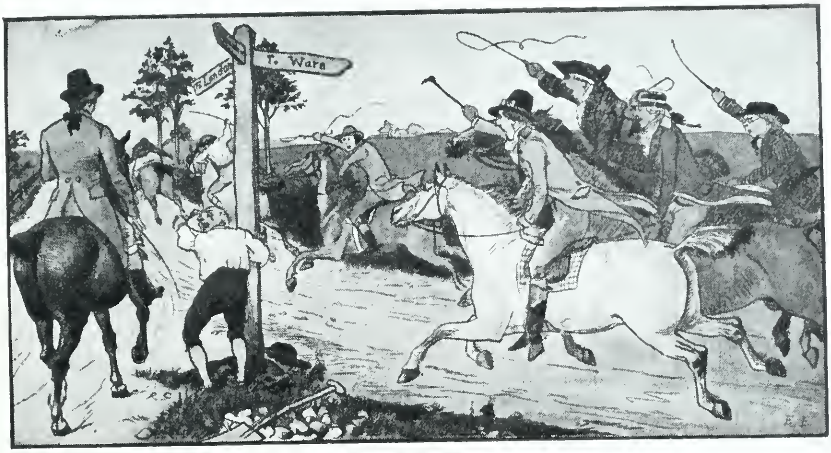
As he lay motionless, the shepherds, fearing he was killed, got their flocks together, and carrying away the dead sheep, of which there were about seven, departed with haste.

When Sancho had come to his master's assistance, Don Quixote, sorely hurt as he was, groaned out that this fresh trouble was again the work of an enchanter. He begged Sancho to follow the sheep, declaring that if he did so he would soon find them resume their former shapes. But Sancho was not to be persuaded this time, and the knight had to yield to his suggestion that they should find their way to a lodging where they might rest.

The most unlucky adventure of his chivalrous career befell Don Quixote when he was the guest of Don Antonio Moreno. He was defeated in combat by the Knight of the White Moon. As a penalty Don Quixote promised to go back to La Mancha.

Shortly afterward knight and squire returned to their native village, wiser, if sadder, than when they first left it. And Don Quixote, dying in his right mind, was deeply mourned by all who knew him, and especially by Sancho Panza.

THE NEXT STORY OF FAMOUS BOOKS IS ON PAGE 1899.



JOHN GILPIN

WILLIAM COWPER, in this celebrated ballad, has made fun, in his own quiet way, of a very worthy old linen-draper who used to have a shop in Paternoster Row, London, where he died in 1791 at the age of ninety-eight. The story was told to the poet by a lady friend in order to entertain him, as he was inclined to melancholy, and, thanks to his genius, it has served to amuse multitudes of readers, and will ever remain a favorite with the countrymen of the poet and the linen-draper. The charming illustrations which we give with the poem are from the well-known drawings of the late Randolph Caldecott, a famous humorous artist.

JOHN GILPIN was a citizen
Of credit and renown,
A train-band captain eke was he
Of famous London town.

John Gilpin's spouse said to her dear,
"Though wedded we have been
These twice ten tedious years, yet we
No holiday have seen.

"To-morrow is our wedding day,
And we will then repair
Unto the Bell at Edmonton
All in a chaise and pair.

"My sister and my sister's child,
Myself, and children three,
Will fill the chaise; so you must ride
On horseback after we."

He soon replied, "I do admire
Of womankind but one,
And you are she, my dearest dear,
Therefore it shall be done.

"I am a linen-draper bold,
As all the world doth know;
And my good friend, the Calender,
Will lend his horse to go."

Quoth Mrs. Gilpin. "That's well said;
And for that wine is dear,
We will be furnish'd with our own,
Which is both bright and clear."

John Gilpin kiss'd his loving wife;
O'erjoy'd was he to find
That, though on pleasure she was bent,
She had a frugal mind.

The morning came, the chaise was brought,
But yet was not allow'd
To drive up to the door, lest all
Should say that she was proud.

So three doors off the chaise was stay'd,
Where they did all get in,
Six precious souls, and all agog
To dash through thick and thin.

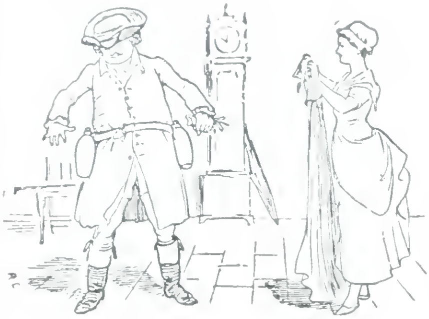
Smack went the whip, round went the wheels,
Were never folk so glad;
The stones did rattle underneath,
As if Cheapside were mad.

John Gilpin, at his horse's side,
Seized fast the flowing mane,
And up he got, in haste to ride,
But soon came down again.

For saddle-tree scarce reach'd had he,
His journey to begin,
When, turning round his head, he saw
Three customers come in.

So down he came; for loss of time,
Although it grieved him sore,
Yet loss of pence, full well he knew,
Would trouble him much more.

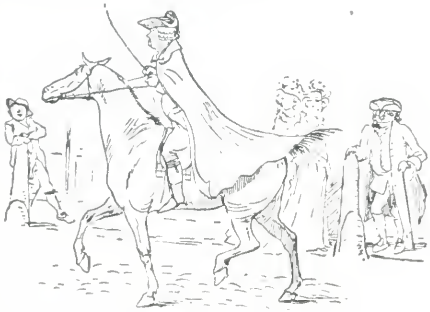
'Twas long before the customers
  Were suited to their mind,
When Betty, screaming, came downstairs,
  "The wine is left behind!"



"Good lack!" quoth he, "yet bring it me,
  My leathern belt likewise,
In which I bear my trusty sword
  When I do exercise."

Now Mistress Gilpin (careful soul!)
  Had two stone bottles found,
To hold the liquor that she loved,
  And keep it safe and sound.

Each bottle had a curling ear,
  Through which the belt he drew
And hung a bottle on each side,
  To make his balance true.



Then over all, that he might be
  Equipp'd from top to toe,
His long red cloak, well brush'd and neat,
  He manfully did throw.

Now see him mounted once again
  Upon his nimble steed,
Full slowly pacing o'er the stones,
  With caution and good heed.

But finding soon a smoother road
  Beneath his well-shod feet,
The snorting beast began to trot,
  Which gall'd him in his seat.

So, "Fair and softly," John he cried,
  But John he cried in vain;
That trot became a gallop soon,
  In spite of curb and rein.

So stooping down, as needs he must
  Who cannot sit upright,
He grasp'd the mane with both his hands,
  And eke, with all his might.

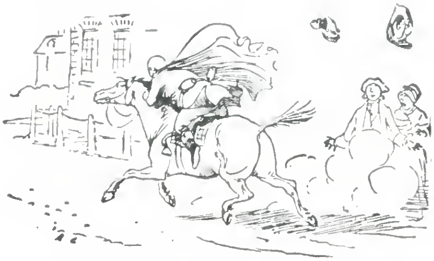
His horse, who never in that sort
  Had handled been before,
What thing upon his back had got
  Did wonder more and more.

Away went Gilpin, neck or nought;
  Away went hat and wig;
He little dreamt, when he set out,
  Of running such a rig.

The wind did blow, the cloak did fly,
  Like streamer long and gay,
Till loop and button failing both,
  At last it flew away.

Then might all people well discern
  The bottles he had slung;
A bottle swinging at each side,
  As hath been said or sung.

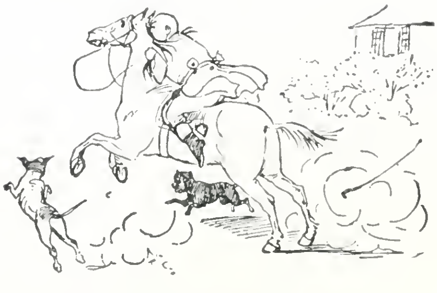
The dogs did bark, the children scream'd,
  Up flew the windows all;
And every soul cried out, "Well done!"
  As loud as he could bawl.



Away went Gilpin—who but he?
  His fame soon spread around,
"He carries weight! he rides a race!
  'Tis for a thousand pound!"

And still as fast as he drew near,
  'Twas wonderful to view
How in a trice the turnpike men
  Their gates wide open threw.

And now, as he went bowing down
  His reeking head full low,
The bottles twain behind his back
  Were shatter'd at a blow.



Down ran the wine into the road,
  Most piteous to be seen,
Which made his horse's flanks to smoke
  As they had basted been.

But still he seem'd to carry weight,
With leathern girdle braced;
For all might see the bottle necks
Still dangling at his waist.

Thus all through merry Islington
These gambols he did play,
Until he came unto the Wash
Of Edmonton so gay;

And there he threw the wash about
On both sides of the way,
Just like unto a trundling mop,
Or a wild goose at play.

At Edmonton his loving wife
From the balcony spied
Her tender husband, wondering much
To see how he did ride.

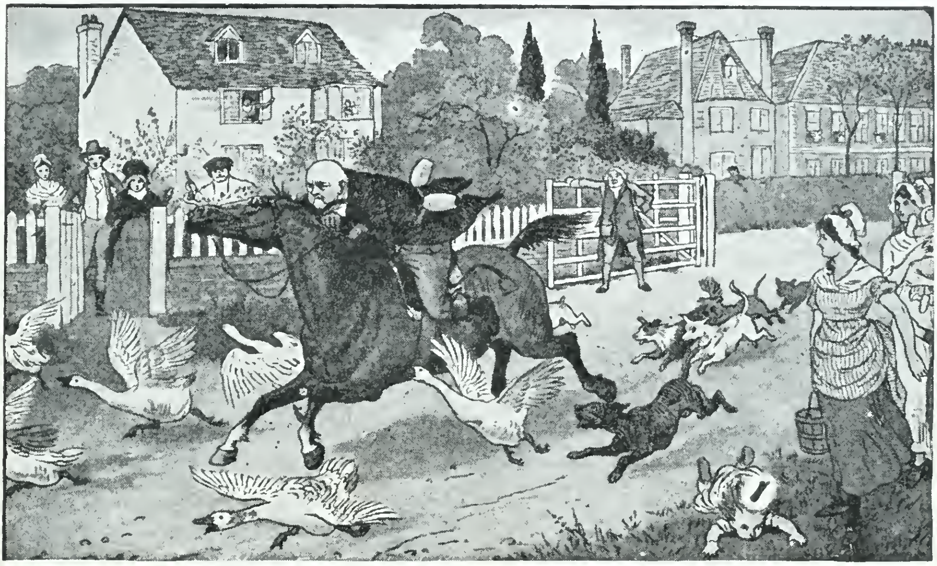
"What news? What news? Your tidings tell;
Tell me you must and shall—
Say, why bare-headed you are come,
Or why you come at all?"

Now Gilpin had a pleasant wit,
And loved a timely joke;
And thus, unto the Calender,
In merry guise he spoke:

"I came because your horse would come;
And, if I well forebode,
My hat and wig will soon be here,
They are upon the road."

The Calender, right glad to find
His friend in merry pin,
Return'd him not a single word,
But to the house went in.

JOHN GILPIN ON HIS WILD CAREER THROUGH MERRY ISLINGTON



The dogs did bark, the children scream'd, up flew the windows all;
And every soul cried out "Well done!" as loud as he could bawl.

"Stop, stop, John Gilpin, here's the house!"
They all aloud did cry;
"The dinner waits, and we are tired."
Said Gilpin, "So am I!"

But yet his horse was not a whit
Inclined to tarry there;
For why? his owner had a house
Full ten miles off, at Ware.

So like an arrow swift he flew,
Shot by an archer strong;
So did he fly—which brings me to
The middle of my song.

Away went Gilpin, out of breath,
And sore against his will,
Till, at his friend the Calender's,
His horse at last stood still.

The Calender, amazed to see
His neighbour in such trim,
Laid down his pipe, flew to the gate,
And thus accosted him.

Whence straight he came, with hat and wig,
A wig that flow'd behind;
A hat not much the worse for wear,
Each comely in its kind.

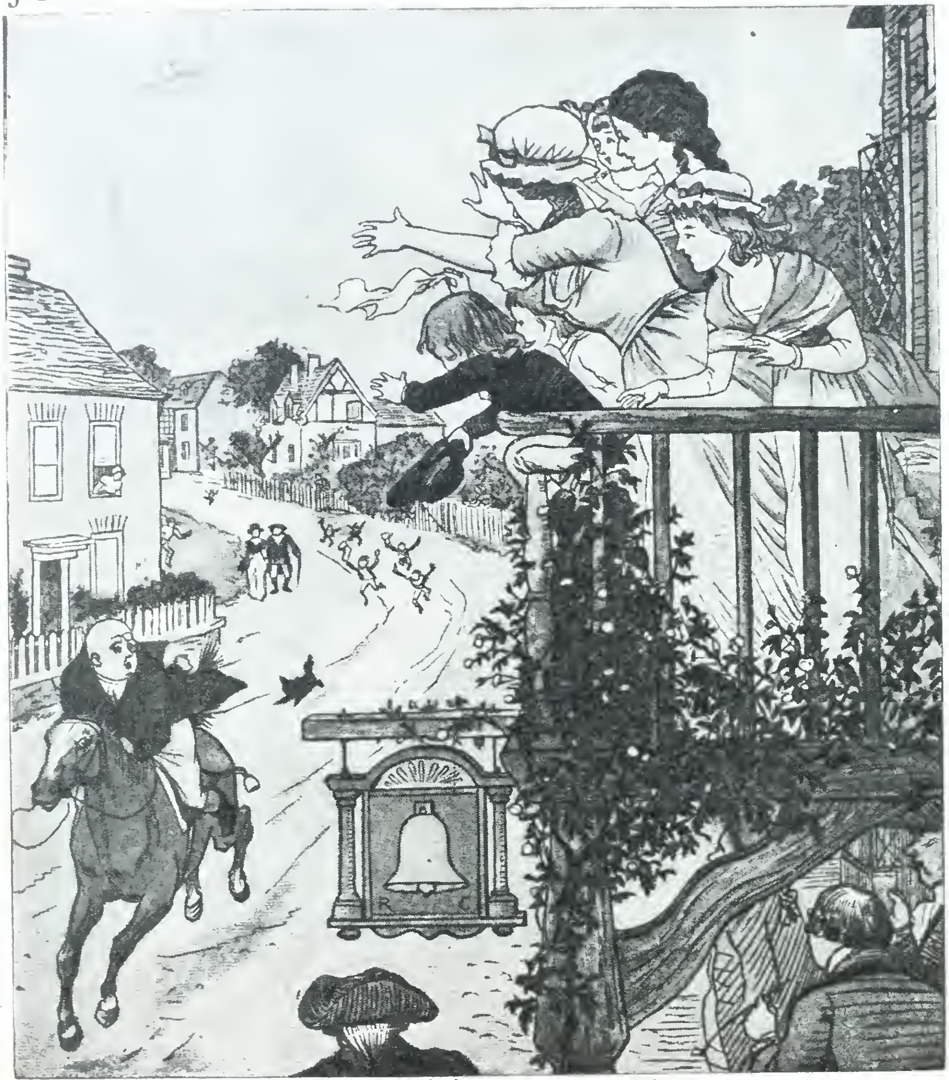
He held them up, and in his turn
Thus show'd his ready wit:
"My head is twice as big as yours,
They therefore needs must fit.

"But let me scrape the dust away,
That hangs upon your face;
And stop and eat, for well you may
Be in a hungry case."

Said John, "It is my wedding day,
And all the world would stare,
If wife should dine at Edmonton,
And I should dine at Ware."

So, turning to his horse, he said:
"I am in haste to dine;
'Twas for your pleasure you came here;
You shall go back for mine."

JOHN GILPIN CANNOT STOP AT THE INN



At Edmonton his loving wife from the balcony spied
Her tender husband, wondering much to see how he did ride.
"Stop, stop, John Gilpin, here's the house!" they all aloud did cry;
"The dinner waits, and we are tired." Said Gilpin, "So am I!"

Ah, luckless speech, and bootless boast!
For which he paid full dear;
For, while he spake, a braying ass
Did sing most loud and clear;

Whereat his horse did snort, as he
Had heard a lion roar,
And gallop'd off with all his might,
As he had done before.

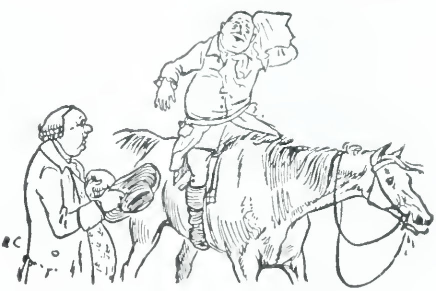
Away went Gilpin, and away
Went Gilpin's hat and wig;
He lost them sooner than at first,
For why?—they were too big.

Now Mrs. Gilpin, when she saw
Her husband posting down
Into the country far away,
She pull'd out half-a-crown.

And thus unto the youth she said,
That drove them to the Bell,
"This shall be yours, when you bring back
My husband safe and well."

The youth did ride, and soon did meet
John coming back amain;
Whom in a trice he tried to stop,
By catching at his rein;

But not performing what he meant,
And gladly would have done,
The frighted steed he frighted more,
And made him faster run.



Away went Gilpin, and away
  Went postboy at his heels,
The postboy's horse right glad to miss
  The rumbling of the wheels.

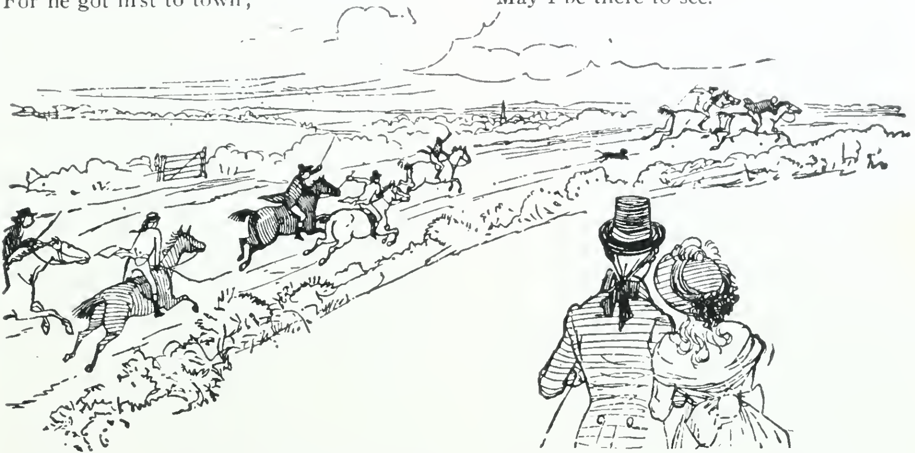
Six gentlemen upon the road
  Thus seeing Gilpin fly,
With postboy scampering in the rear,
  They raised a hue and cry:

"Stop thief! Stop thief! A highwayman!"
  Not one of them was mute;
And all and each that pass'd that way
  Did join in the pursuit.

And now the turnpike gates again
  Flew open in short space:
The toll-men thinking, as before,
  That Gilpin rode a race.

And so he did, and won it too,
  For he got first to town;
Nor stopp'd till where he had got up
  He did again get down.

Now let us sing, long live the king,
  And Gilpin, long live he;
And, when he next doth ride abroad,
  May I be there to see.



KING LEAR AND HIS THREE DAUGHTERS

The story of King Lear has often been used by poets and painters as the theme of their art for it is full of dramatic possibilities. Shakespeare's great tragedy was founded upon an old English legend, and here is the legend, as told in an old ballad, the author of which is, of course, unknown. In the ballad the king's name is spelt Leir, but here we have given it the same spelling as it has in Shakespeare's play.

KING LEAR once ruled in his land
  With princely power and peace;
And had all things with heart's content,
  That might his joys increase.
Amongst those things that Nature gave,
  Three daughters fair had he,
So princely seeming, beautiful,
  As fairer could not be.

So on a time it pleased the king
  A question thus to move,
Which of his daughters to his Grace
  Could shew the dearest love;
"For to my age you bring content,"
  Quoth he, "then let me hear,
Which of you three in plighted troth
  The kindest will appear."

To whom the eldest thus began:
  "Dear father, mine," quoth she,
"Before your face to do you good,
  My blood shall rendered be;
And for your sake my bleeding heart
  Shall here be cut in twain,
Ere that I see your reverend age
  The smallest grief sustain."

"And so will I," the second said,
  "Dear father, for your sake,
The worst of all extremities
  I'll gently undertake;
And serve your Highness night and day
  With diligence and love,
That sweet and quietness
  Discomforts may remove."

"In doing so, you glad my soul,"
  The agèd king replied;
"But what sayest thou, my youngest girl,
  How is thy love allayed?"
"My love" (quoth young Cordelia then)
  "Which to your Grace I owe,
Shall be the duty of a child,
  And that is all I'll show."

"And wilt thou show no more," quoth he,
  "Than doth thy duty bind?
I well perceive thy love is small
  When as no more I find.
Henceforth I banish thee my court,
  Thou art no child of mine;
Nor any part of this my realm
  By favour shall be thine.

"Thy elder sisters' loves are more
Than I can well demand
To whom I equally bestow
My kingdom and my land,
My pompal state and all my goods,
That lovingly I may
With those thy sisters be maintained
Until my dying day."

Thus flattering speeches won renown
By these two sisters here;
The third had causeless banishment,
Yet was her love more dear;
For poor Cordelia patiently
Went wandering up and down
Unhelped, unpitied, gentle maid,
Through many an English town.

Until at last in famous France
She gentler fortunes found;
Though poor and bare, yet she was deemed
The fairest on the ground;
Where, when the king her virtues heard,
And this fair lady seen,
With full consent of all his court,
He made his wife and queen.

Her father King Lear this while
With his two daughters stayed:
Forgetful of their promised loves,
Full soon the same decayed;
And living in Queen Regan's court,
The eldest of the twain,
She took from him his chiefest means,
And most of all his train.

For whereas twenty men were wont
To wait with bended knee,
She gave allowance but to ten
And after scarce to three;
Nay, one she thought too much for him;
So took she all away,
In hope that in her court, good king,
He would no longer stay.

"Am I rewarded thus," quoth he,
"In giving all I have
Unto my children, and to beg
For what I lately gave?
I'll go unto my Goneril:
My second child, I know,
Will be more kind and pitiful,
And will relieve my woe."

Full fast he hies then to her court;
Where, when she heard his moan,
Returned him answer, that she grieved
That all his means were gone.
But no way could relieve his wants;
Yet, if that he would stay
Within her kitchen, he should have
What scullions gave away.

When he had heard with bitter tears,
He made his answer then;
"In what I did, let me be made
Example to all men.
I will return again," quoth he,
"Unto my Regan's court;
She will not use me thus, I hope,
But in a kinder sort."

Where, when he came, she gave command
To drive him thence away;
When he was well within her court
(She said) he would not stay.

Then back to Goneril,
The woeful king did hie,
That in her kitchen he might have
What scullion boys set by.

But there of that he was denied,
Which she had promised late:
For once refusing, he should not
Come after to her gate.
Thus 'twixt his daughters, for relief
He wandered up and down;
Being glad to feed on beggar's food,
That lately wore a crown.

And calling to remembrance then
His youngest daughter's words,
That said the duty of a child
Was all that love affords;
But doubting to repair to her
Whom he had banished so,
Grew frantic mad; for in his mind
He bore the wounds of woe:

Which made him rend his milk-white locks
And tresses from his head,
And all with blood bestain his cheeks,
With age and honour spread.
To hills and woods and watery founts
He made his hourly moan,
Till hills and woods and senseless things
Did seem to sigh and groan.

Even thus possessed with discontents,
He passèd o'er to France,
In hopes from fair Cordelia there,
To find some gentler chance;
Most virtuous dame! which when she heard
Of this her father's grief,
As duty bound, she quickly sent
Him comfort and relief.

And by a train of noble peers,
In brave and gallant sort,
She gave in charge he should be brought
To Aganippus' court;
Whose royal king, with noble mind,
So freely gave consent,
To muster up his knights at arms,
To fame and courage bent.

And so to England came with speed,
To repossess King Lear,
And drive his daughters from their thrones
By his Cordelia dear.
Where she, true-hearted, noble queen,
Was in the battle slain:
Yet he, good king, in his old days,
Possessed his crown again.

But when he heard Cordelia's death,
Who died, indeed for love
Of her dear father, in whose cause
She did this battle move:
He swooning fell upon her breast,
From whence he never parted;
But on her bosom left his life,
That was so truly hearted.

The lords and nobles when they saw
The end of these events,
The other sisters unto death
They doomèd by consents;
And being dead, their crowns they left
Unto the next of kin;
Thus have you seen the fall of pride,
And disobedient sin.

ON FIRST LOOKING INTO CHAPMAN'S HOMER

MUCH have I travell'd in the realms of gold,
And many goodly states and kingdoms seen,
Round many western islands have I been,
Which bards in fealty to Apollo hold.
Oft of one wide expanse had I been told
That deep-brow'd Homer ruled as his demesne:
Yet did I never breathe its pure serene
Till I heard Chapman speak out loud and bold:
—Then felt I like some watcher of the skies
When a new planet swims into his ken;
Or like stout Cortez—when with eagle eyes
He stared at the Pacific, and all his men
Look'd at each other with a wild surmise—
Silent, upon a peak in Darien.

—JOHN KEATS.

LINCOLN, THE MAN OF THE PEOPLE*

WHEN the Norn Mother saw the Whirlwind Hour
Greatening and darkening as it hurried on,
She left the Heaven of Heroes and came down
To make a man to meet the mortal need.
She took the tried clay of the common road—
Clay warm yet with the genial heat of Earth,
Dashed through it all a strain of prophecy;
Tempered the heap with thrill of human tears;
Then mixed a laughter with the serious stuff.
Into the shape she breathed a flame to light
That tender, tragic, ever-changing face.
Here was a man to hold against the world,
A man to match the mountains and the sea.

The colour of the ground was in him, the red earth;
The smack and tang of elemental things:
The rectitude and patience of the cliff;
The good will of the rain that loves all leaves;
The friendly welcome of the wayside well;
The courage of the bird that dares the sea;
The gladness of the wind that shakes the corn;
The pity of the snow that hides all scars;
The secrecy of streams that make their way
Beneath the mountain to the rifted rock;
Tolerance and equity of light
That gives as freely to the shrinking flower
As to the great oak flaring to the wind—
To the grave's low hill as to the Matterhorn
That shoulders out the sky.

Sprung from the West,
The strength of virgin forests braced his mind,
The hush of spacious prairies stilled his soul.
Up from log cabin to the Capitol,
One fire was on his spirit, one resolve—
To send the keen axe to the root of wrong,
Clearing a free way for the feet of God.
And evermore he burned to do his deed
With the fine stroke and gesture of a king:
He built the rail-pile as he built the State,
Pouring his splendid strength through every blow,
The conscience of him testing every stroke,
To make his deed the measure of a man.
So came the Captain with the mighty heart;
And when the judgment thunders split the house,
Wrenching the rafters from their ancient rest,
He held the ridgepole up, and spiked again
The rafters of the Home. He held his place—
Held the long purpose like a growing tree—
Held on through blame and faltered not at praise,
And when he fell in whirlwind, he went down
As when a lordly cedar, green with boughs,
Goes down with a great shout upon the hills,
And leaves a lonesome place against the sky.

—EDWIN MARKHAM.

HAIL, COLUMBIA

This national song, written in 1798, was composed to inspire patriotism. The author, Joseph Hopkinson, was the son of one of the signers of the Declaration of Independence.

HAIL, Columbia! happy land!
Hail, ye heroes! heaven-born band!
Who fought and bled in Freedom's cause,
Who fought and bled in Freedom's cause,
And when the storm of war was gone,
Enjoyed the peace your valour won;
Let independence be our boast,
Ever mindful what it cost,
Ever grateful for the prize,
Let its altar reach the skies.

Chorus

Firm, united let us be,
Rallying round our liberty,
As a band of brothers joined,
Peace and safety we shall find.

Immortal patriots, rise once more,
Defend your rights, defend your shore;
Let no rude foe with impious hand,
Let no rude foe with impious hand,
Invade the shrine where sacred lies
Of toil and blood the well-earned prize;
While offering peace, sincere and just,
In Heaven we place a manly trust
That truth and justice may prevail,
And every scheme of bondage fail.—*Cho.*

Behold the chief who now commands,
Once more to serve his country stands!
The rock on which the storm will beat!
The rock on which the storm will beat!
But, armed in virtue, firm and true,
His hopes are fixed on Heaven and you.
When hope was sinking in dismay,
When gloom obscured Columbia's day,
His steady mind, from changes free,
Resolves on death or liberty.—*Cho.*

MOTHER'S WORLD

This pretty little poem of a mother's love for her children was written by Margaret H. Alden, a Canadian poet.

EYES of blue and hair of gold,
Cheeks all brown with summer tan,
Lips that much of laughter hold,
That is mother's little Man.

Shining curls like chestnut brown,
Long-lashed eyes demure and staid,
Sweetest face in all the town,
That is mother's little Maid.

Dainty room with snow-white beds,
Where, like flowers with petals curled,
Rest in peace two dreaming heads,
That is mother's little world!

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*By permission of Edwin Markham.

THE TIDE RIVER

The changing nature of a great river that rises clear and cool among the hills and flows ever increasing through pretty scenes and ugly scenes, by fresh meadows and murky towns, and at length falls into the mighty ocean, is described with power and truth in this poem by Charles Kingsley.

CLEAR and cool, clear and cool,
By laughing shallow and dreaming pool;
Cool and clear, cool and clear,
By shining shingle and foaming wear;
Under the crag where the ouzel sings,
And the ivied wall where the church-bell rings,
Undefiled, for the undefiled.
Play by me, bathe in me, mother and child.

Dank and foul, dank and foul,
By the smoky town in its murky cowl;
Foul and dank, foul and dank,
By wharf, and sewer, and slimy bank;
Darker and darker the farther I go,
Baser and baser the richer I grow;
Who dare sport with the sin-defiled?
Shrink from me, turn from me, mother and child.

Strong and free, strong and free,
The floodgates are open, away to the sea.
Free and strong, free and strong,
Cleansing my streams as I hurry along,
To the golden sands and the leaping bar,
And the taintless tide that awaits me afar,
As I lose myself in the infinite main,
Like a soul that has sinned and is pardoned again,
Undefiled for the undefiled.
Play by me, bathe in me, mother and child.

UNDER MY WINDOW

Under My Window is a quaint little poem which you will discover to be fairly rippling over with childish mischief and fun and frolic. It was written by Thomas Westwood.

UNDER my window, under my window,
All in the midsummer weather,
Three little girls, with fluttering curls,
Flit to and fro together:—
There's Bell with her bonnet of satin sheen,
And Maud with her mantle of silver-green,
And Kate with her scarlet feather.

Under my window, under my window,
Leaning stealthily over,
Merry and clear, the voice I hear
Of each glad-hearted rover.
Ah! sly little Kate, she steals my roses,
And Maud and Bell twine wreaths and posies,
As merry as bees in clover.

Under my window, under my window,
In the blue midsummer weather,
Stealing slow, on a hushed tiptoe,
I catch them all together:—
Bell with her bonnet of satin sheen,
And Maud with her mantle of silver-green,
And Kate with the scarlet feather.

Under my window, under my window,
And off through the orchard closes;
While Maud she flouts, and Bell she pouts,
They scamper, and drop their posies;
But dear little Kate takes nought amiss,
And leaps in my arms with a loving kiss,
And I give her all my roses.

MY MOTHER'S HANDS*

Mothers, mothers, how much they do for us! How little we comprehend the enfolding wonder of their love! "There are no old mothers, there are no sad mothers, there are no tired mothers," says Maeterlinck in one act of his play The Blue Bird. Mothers' hands are always beautiful, and they never really grow old, says Ellen M. H. Gates.

SUCH beautiful, beautiful hands!
They're neither white nor small;
And you, I know, would scarcely think
That they were fair at all.
I've looked on hands whose form and hue
A sculptor's dream might be;
Yet are those wrinkled, agèd hands
Most beautiful to me.

Such beautiful, beautiful hands!
Though heart were weary and sad,
These patient hands kept toiling on,
That the children might be glad;
I always weep, as looking back
To childhood's distant day,
I think how those hands rested not,
When mine were at their play.

Such beautiful, beautiful hands!
They're growing feeble now,
For time and pain have left their mark
On hands, and heart, and brow.
Alas! Alas! the nearing time,
And the sad, sad day to me,
When 'neath the daisies, out of sight,
These hands will folded be.

But oh, beyond this shadow land,
Where all is bright and fair,
I know full well these dear old hands
Will palms of victory bear;
Where crystal streams through endless years
Flow over golden sands,
And where the old grow young again,
I'll clasp my mother's hands.

A MAN'S REQUIREMENTS

These simple lines are full of charm. They picture for us true love in many phases. They were written by Elizabeth Barrett Browning, one of the most inspired of women poets.

LOVE me, sweet, with all thou art
Feeling, thinking, seeing;
Love me in the lightest part,
Love me in full being.

Love me with thine open youth
In its frank surrender;
With the vowing of thy mouth,
With its silence tender.

Love me with thy azure eyes,
Made for earnest granting;
Taking colour from the skies,
Can Heaven's truth be wanting?

Love me in thy gorgeous airs,
When the world has crowned thee;
Love me kneeling at thy prayers,
With the angels round thee.

Love me pure, as musers do,
Up the woodlands shady;
Love me gaily, fast and true,
As a winsome lady.

---

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MORE WORTHWHILE GAMES

Word Games and Reading Games About Animals

A LITTLE friend of mine who was camping with her father and mother woke up one morning and saw a big brown animal. They all lay very still and looked very hard and they saw the baby up in the tree near by. Do you know any animal that is brown and whose baby can climb a tree? Perhaps then you can guess what this little girl saw. A bear.

You will find the picture of a bear on page 16 of your Work Book, and you can make a bear card. You remember how you made the cards for the fruits and vegetables. You can make another set of cards for animals with these animal pictures from your Work Book. It is easier to color the animals before you mount them. Do it as carefully as you can, for you want your game cards to be so pretty you and your friends will all enjoy playing with them. Use the colors at the end of your Work Book to put on the backs of your animal cards. Use the ones that are marked for page 1647. A dog is very often brown, so the dog can be your other brown animal.

And what white animals do you know? A pet rabbit is white and a cow is white. And do you know any yellow animals? Many birds are yellow, and some of your friends may have a yellow chicken. There are black animals, too—a dog, a cat, a horse, a cow, a bird, all of these are black. We haven't a horse yet, so

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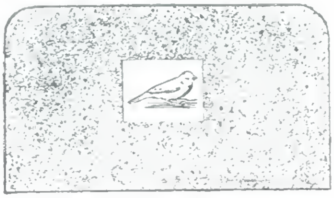
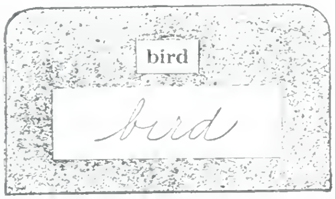
let's have a black horse, and perhaps a black bird, since so many birds are black. Do you know any gray animals? Both the cat and the mouse are gray. But blue? The bluebird is a good friend, and some butterflies are blue.



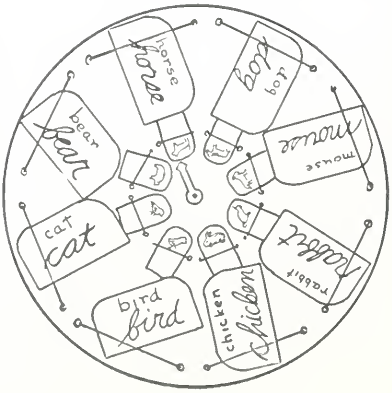


See how many games you can make up using these cards and the color word cards. You have no word cards for black, white and gray, but you can make them. The colors are at the back of your Work Book, and the words on page 20 of your Work Book. You can play just as you played the last fruit and vegetable games, and you can make up new ones.

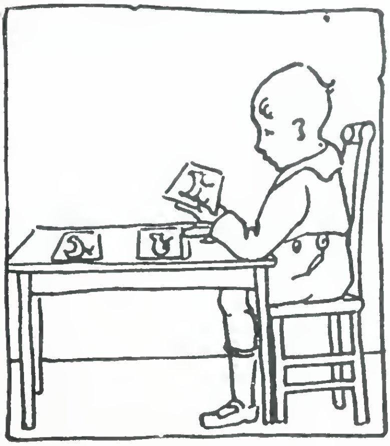
As soon as you can play those games, make a word card for each animal. The animals and words are on pages 17, 18, 19, 20 of your Work Book. Then you can make harder games. Here are a few to start you off.

USE your big wheel. Make a new circle of tapes or elastic, as in the picture. Draw it about four inches from the centre. The spaces where the rubber is on top are about three inches, and where the rubber is underneath about one inch.

In these new tapes put the animal cards you have just made. In the outer tapes put the animal word cards. Now you are ready to play.



Spin the spinner. Look at the animal it points to and find the word card that matches it. To be sure you are right, turn the word card over and see if the same animal is there. If you are right, take the card. You can tell your score by counting the cards you have at the end of the game. Be sure you draw a ring around your best score.

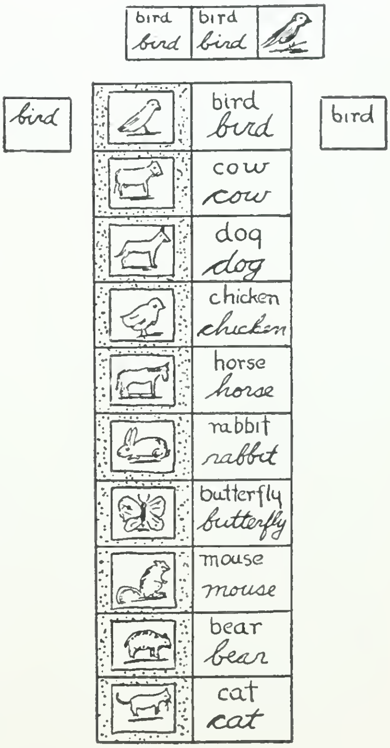


LOOK at the child in the picture on this page. He didn't win as many word and reading games as he wanted to. So he is practicing up by himself. He is using his word cards, a whole pile of them, with a plain-colored card at the bottom of the pile. He picks up one card at a time, says what he thinks the word is, and then looks on the other side. If he is right, he puts the card in a new pile he calls his "Just Right" pile, or his "I know" pile. If he is right every time, he will get every word card into the "I know" pile and have left only the plain-colored card.

Any word that he says wrong he puts back at the bottom of his pile under the colored card. When he comes to the colored card he stops and counts up to see how many of the words he knows Just Right. That is his score the first time through the pile. He tries again all those he did not know until he can get them every one into the "I know" pile.

When he gets them all in, he mixes the cards all up and starts the game over again to see if he can't do better than his first score. And usually he does. It isn't long before he gets a Just Right score.

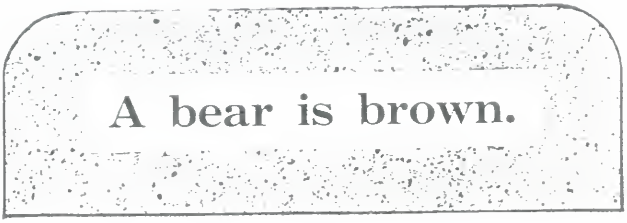
THIS is another practice game. You know when bigger boys don't get enough turns in games like hopscotch they go out all alone and practice up. So if you haven't already learned these animal words, here is a practice game in which I am sure you can learn them.

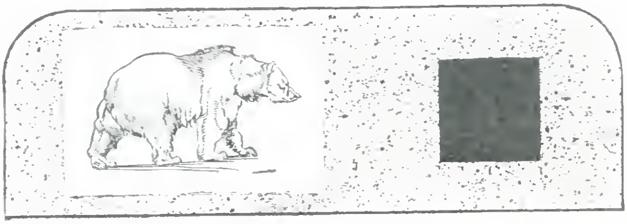

bird
bird
bird
bird
bird
bird
bird
bird
bird
cow
cow
dog
dog
chicken
chicken
horse
horse
rabbit
rabbit
butterfly
butterfly
mouse
mouse
bear
bear
cat
cat

You make this just as you did your practice game for the color words. You will need to make this game a little longer than that game on page 1294, for you will have ten words instead of six. If each space is two inches wide, you will need a long card—twenty inches long for all ten words.

You will find the words and the pictures for the animals on pages 21 and 22 of your Work Book.

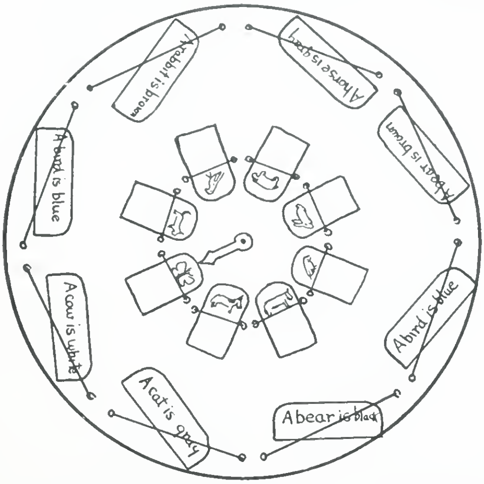
WHAT are you learning words for? Yes, of course, you want to read with them, don't you? And I am sure you can read with the words you have already learned. Here is a reading game. Every sentence tells what color some animal is. And you know the animal words and you know the color words, so of course you can read every one.


A bear is brown.



On page 23 of your Work Book you will find the sentences. Mount each one on a card that fits it, perhaps two inches by six inches. Then look every one of the animal words up in your word cards and draw a picture on the back of the card at the same end where the animal word is. At the other end of the card where the color word is, draw a block of the color it says. The pictures above show you how to make the fronts and backs of the cards. So when you play the game real fast you will not need to stop every turn to look up about a word, but you can turn your card over quickly, and if you are right, go on reading the next card.

There are so many ways you can play with these cards that I don't know which way to tell you first. You can put them in a pile and each of you take a turn reading a card and then showing the back to the others. If you read it right, you keep it for scoring. If you did not read it right, look at it carefully so it will not puzzle you if you get it again, and put it back into the game. The one who has the most cards at the end of the game wins. Keep the score in your book.

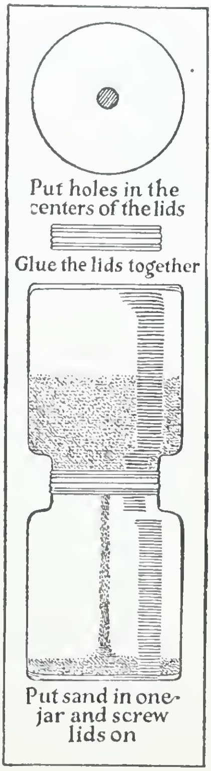

A rabbit is brown
A horse is gray
A goat is brown
A bird is blue
A bird is blue
A cow is white
A cat is black
A bear is black

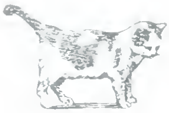
YOU can put these cards in the big wheel and use the spinner to tell you which one to read when it is your turn. But here is a hard way to play this reading game with the big wheel. Put the sentence cards in the outer tapes. In the middle tapes put the animal word cards, picture side up. When it is your turn, spin. Look at the picture the spinner points to. Then see if you can find a sentence which tells about that animal. Sometimes there are two sentence cards about the same animal. If you can find both of them quickly, you may score two for that one turn.

So that the children will not have to wait too long for their turns, you better make some sort of timer. Then each of you will have a turn just as long as everybody else's, and each of you will have to wait just as long as everybody else. That's fair when it's the same for everyone.

YOU can make a good timer with two bottles such as the ones in which mother gets salad dressing. The picture shows you how to put them together. Practice first with one bottle until you get the hole just big enough for the sand to run out in the time you think a turn should be. Then make the hole in the other cover a little bigger than that one. Glue the two covers together.

When you start to take a turn in a game, turn the timer so the sand will begin to run. When the top bottle is empty, your turn is up. Some child may watch the timer while you take your turn.


Put holes in the centers of the lids
Glue the lids together
Put sand in one jar and screw lids on



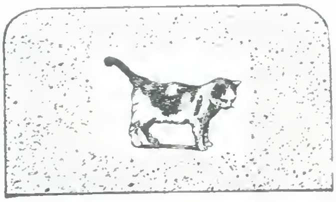
Who says Meow-meow?

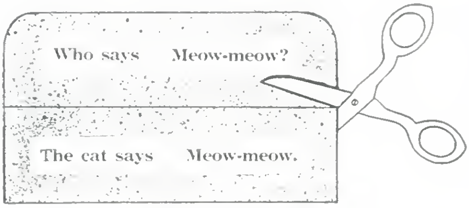
The cat says Meow-meow.

WHO says Meow-meow?
Who says Bow-wow?
Who says Moo-moo?
Who says Woof-woof?
Who says Tweet-tweet?
Who says Cheep-cheep?

You know what all these animals say, so I am sure you can play this new reading game. My children call it the "Who says" game.

On pages 24 and 25 of your Work Book you will find the questions. They all begin with "Who says." The answers are there, too, both in words and in pictures.





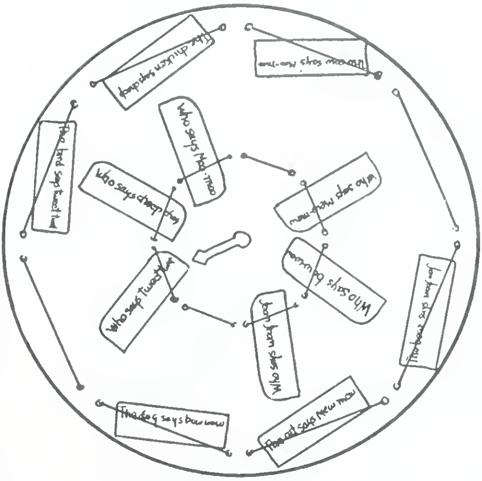
Who says Meow-meow?
The cat says Meow-meow.

Cut six cards about six inches one way and four inches the other. Draw a line through the middle of each card as in the picture. You can find the middle with your ruler. Each side is four inches, so the middle will be at two inches. Cut the top corners round.

Now find the first question and answer.

Who says Meow-meow?
The cat says Meow-meow.

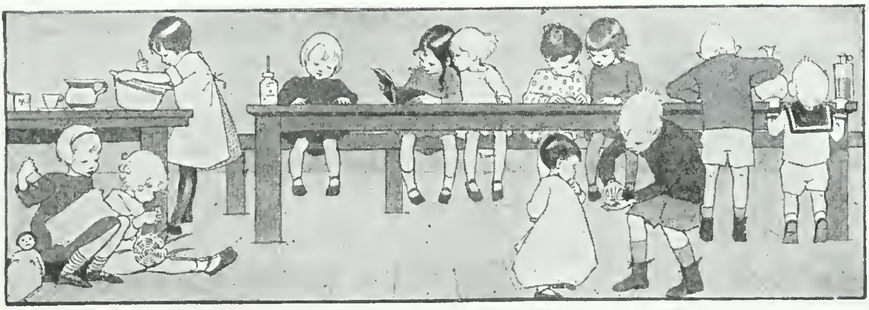
Mount them as in the picture. Be sure to put the reading right side up. Remember the round corners are at the top. Now turn your card over and mount the picture of the cat. Make the cat stand right side up too, and right in the middle of the card. Cut the card in two, right on the line you drew. What happens to the cat? Make your other cards the same way.


The chicken says cheep
The cow says moo-moo
The bird says tweet tweet
Who says moo-moo
Who says cheep cheep
Who says mew-mew
Who says tweet tweet
Who says bow-wow
The dog says bow wow
The cat says mew mew

WHEN your game is finished you may start playing it alone, matching the questions and answers. Or you may like better to put the "Who says" cards in the centre tapes of your big wheel and the answer cards in the outer tapes. When it is your turn, spin the spinner and read the question if you can. If you read it, score. If you didn't read it, and can't, look on the back for some help. Part of the picture there will help you enough so you can surely read it now, but of course you will not score this time.

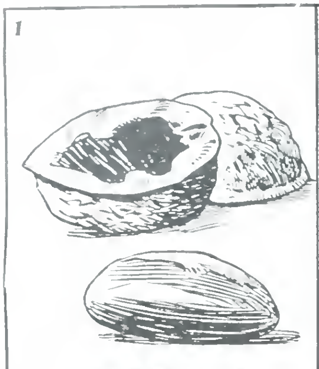
Put the question out of sight and look for the answer to it. When you find the one you think is right, read it and match the two cards together. If they make the whole picture on the back, you are right. So score one for finding and reading the answer. If you didn't score for the question, your score is one. If you scored for the question too, then your score for this turn is two.

If you ever have any trouble about finding the answer card, you can always get help from your question card that you have already read. Match the talking part of the sentence "Bow-wow" or "Moo-moo," or whatever the animal says. But of course you score only when you read without help, for this is a reading game.



THE NEXT HELPS TO LEARNING ARE ON PAGE 1891.

WHAT IS WRONG IN THESE PICTURES?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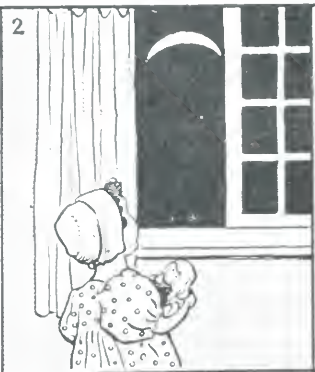
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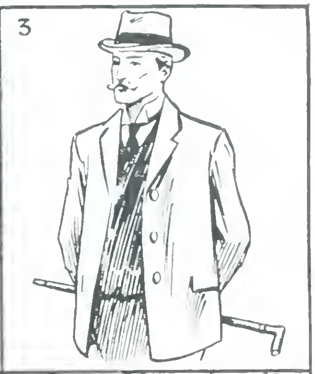
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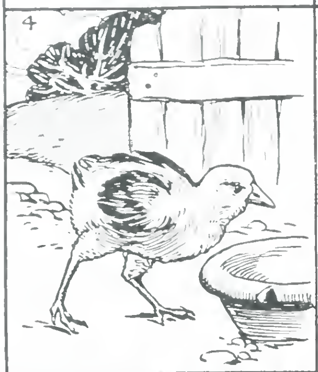
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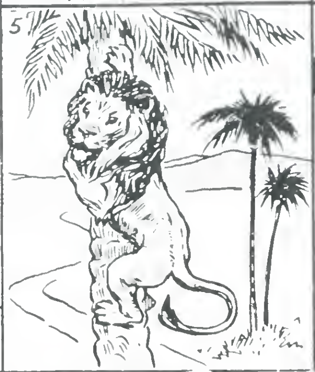
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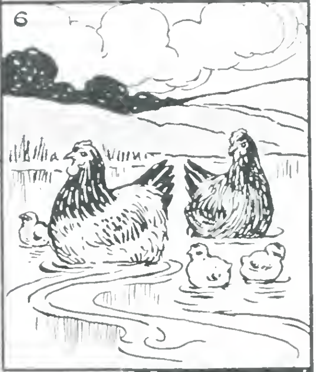
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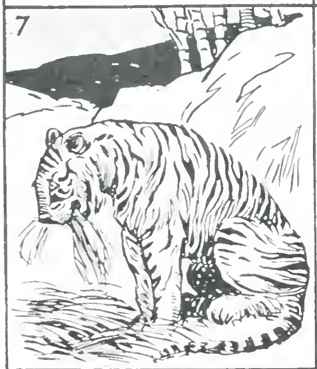
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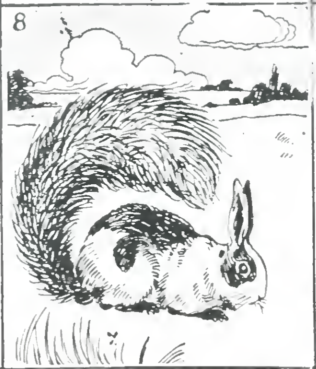
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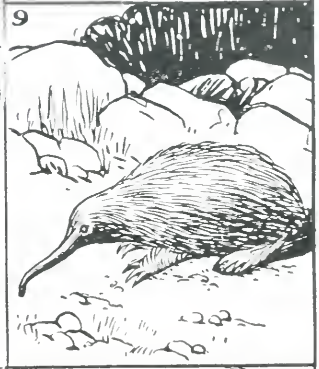
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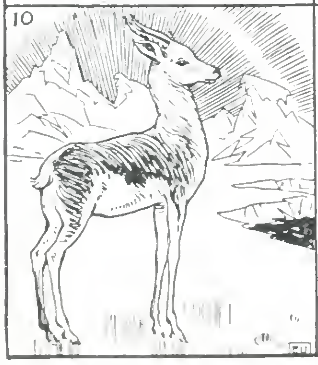
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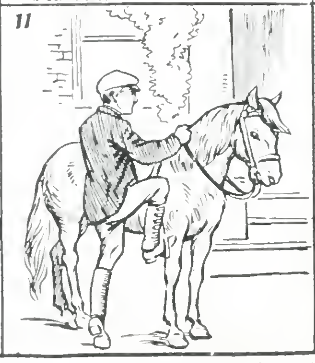
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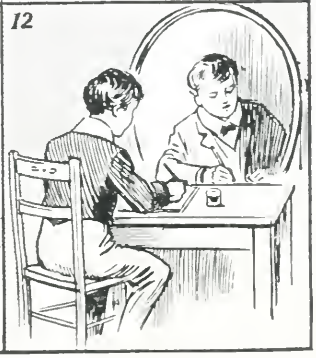
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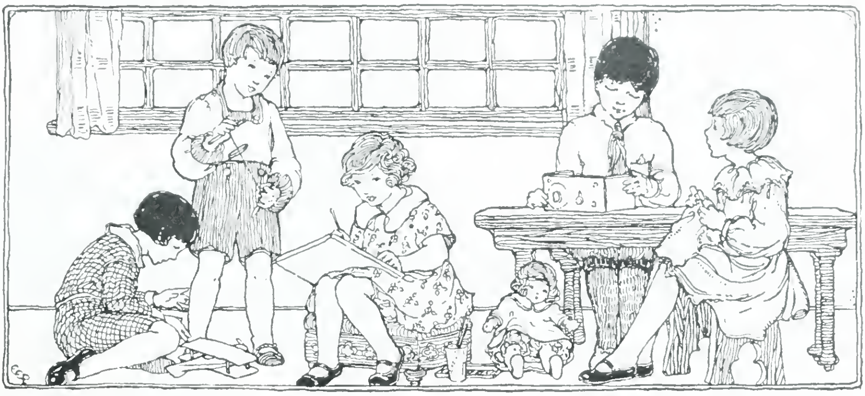
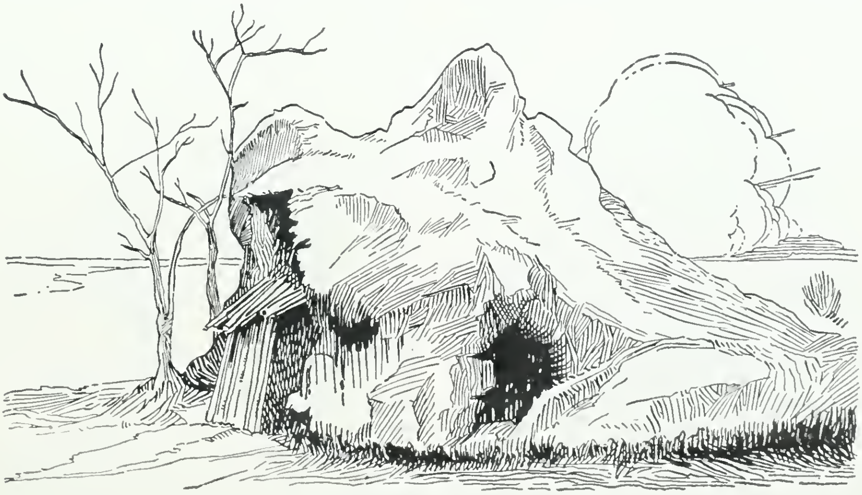
There is something wrong in each of these pictures. It will help us to cultivate our powers of observation to try to discover the mistakes the artist has purposely made. They are pointed out on page 1769.



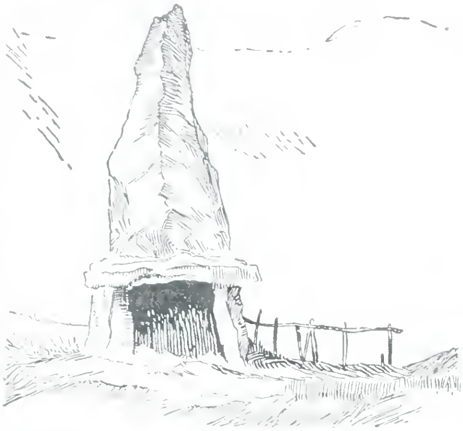
FINDING OUT HOW EARLY PEOPLES WERE HOUSED

YOU are quite familiar with the kinds of houses in which we now live, but have you ever heard the story of how people were housed many, many years ago? While you will be interested to find out just how these different peoples were sheltered, this information is given so that you may know how to draw and make many of these forms of shelter during out-of-school hours and especially during your summer vacation. Although many of the materials mentioned will not be at hand, you will find it possible, in most cases, to substitute other materials which will answer your purpose.

Long, long ago, there was a time when the people did not have homes, but wandered from one place to another. About the only shelter which these primitive people had was the wide-spreading tree, under which they protected themselves from the hot rays of the sun and from the rain during the day. Perhaps they slept in the branches at night for protection from wild animals. These people had doubtless been in caves from time to time, but probably they found it necessary to choose tall trees in order that they might be safe from the wild animals. The location of the tree-dweller's house was usually near the river, where he might have fresh water at a convenient distance. On the other hand, it was desirable for him to be located where roots and berries, his chief foods, were found in abundance. Later these early people learned how to use fire, and with its protection began to build crude brush huts on the ground. During the summers these huts answered the

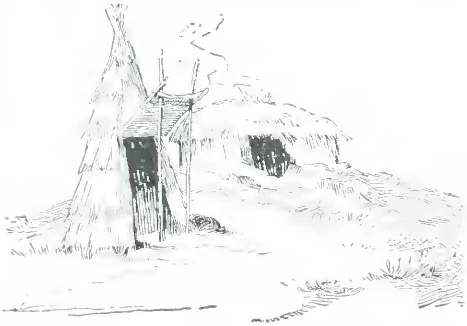


A shelter under the rocks.



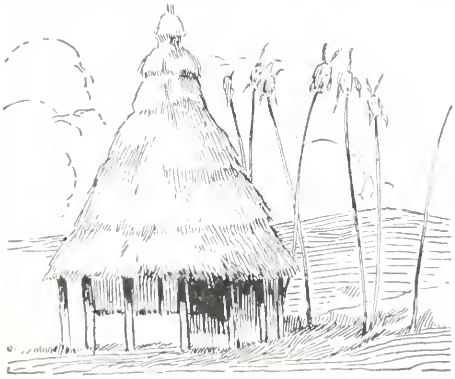
Another form of stone shelter.

purpose very well, but when the cold weather came they were confronted with a new problem. They then left their huts, as the caves in the rocks and holes in the earth became their warmer shelter.

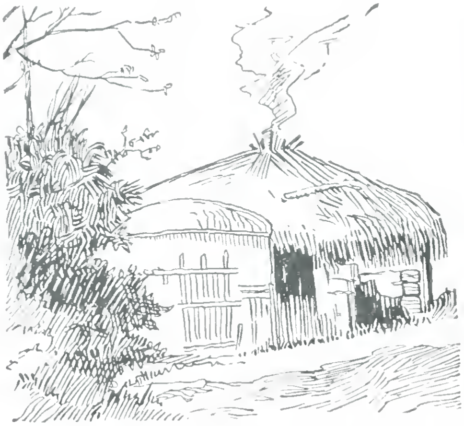


Two forms of early branch and grass huts.

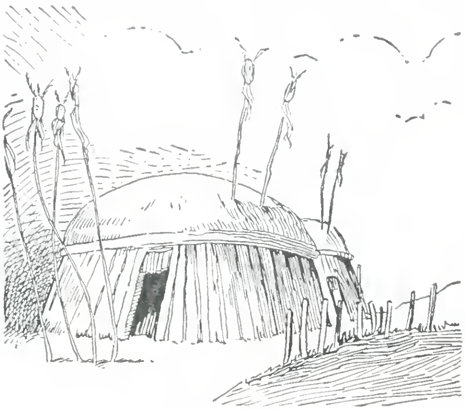
The new discovery of fire had not only given them a means of keeping the wild animals away but it had also furnished their homes with ample heat.



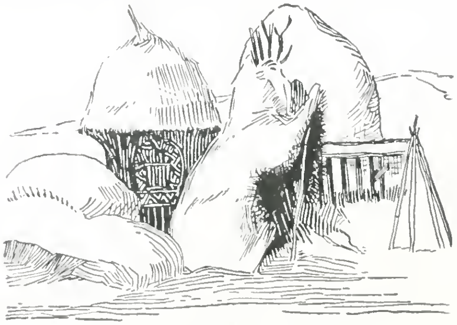
The hut of an African savage.



A Gallic hut.

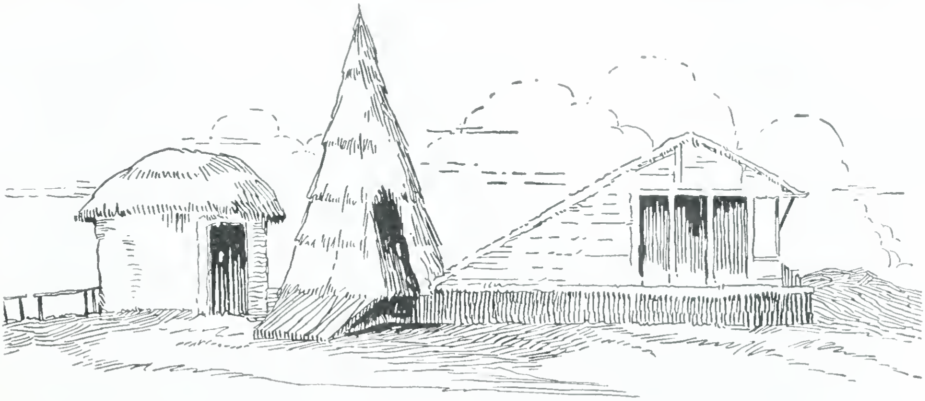


A Mexican hut.



The hut of a Laplander.

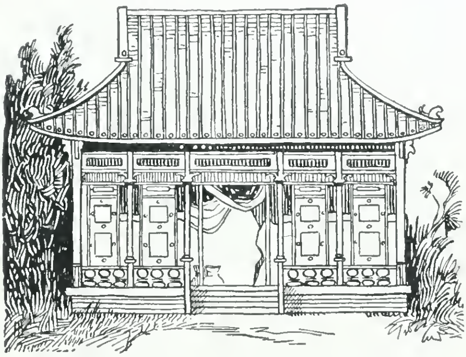
Somewhat later they learned how to make shelter from branches which were covered either with leaves or with grass. This soon led to the making of huts by twisting the branches together and chinking them with mud. To-day in Australia and in the southern part of South America the forms of shelter are still of this most primitive type. The little homes of the Pigmies of Central Africa are no better. Their homes are made of branches stuck into the ground in such a manner that they lean toward one another. After the tops of the branches have been tied, the sides are thatched with leaves and grass. The Negritos, known as the Black Dwarfs of the Philippine Islands, live in similar homes. In the southern part of our own country there are still some re-



Three typical huts built by the natives of India.

mains of the Indian cliff-dwellers, who lived in crevices of the cliffs, which they walled up with stone. Other clans of cliff-dwellers have been located farther south, in Mexico.

The first real home that replaced the cave homes and the brush tents was probably built of stone. The early stone home consisted of rude walls of piled stones and was usually covered with a roof of finer stones and some mud. This form of shelter was later improved, however, by cutting the stones into blocks.

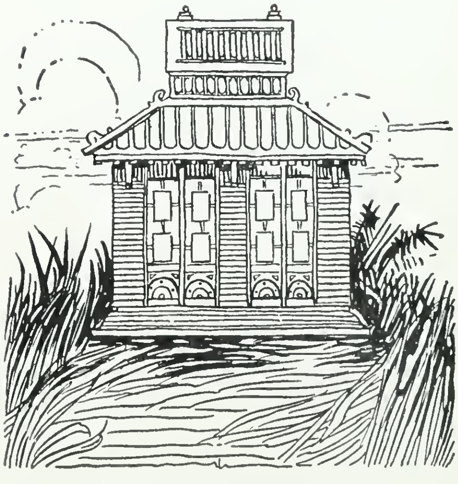


A typical Chinese dwelling of the upper class.

The Arabs used tents for their shelter, as it was necessary for them to move from place to place to get food for their flocks and herds. Of the people who demanded a permanent home, the hut is perhaps the simplest form. This is still the chief dwelling of the Africans and the South Sea Islanders, and also furnishes homes for many of the people in China, India, South America, southwestern United States, Mexico and some parts of Europe. The climate and the materials of the particular locality largely determine the nature of the huts. The Eskimos, who live in skin tents during the summer, use snow and ice to make their winter homes. These huts are usually built half underground and are roofed with snow and ice. Through ground and walls passages are dug so that the people can crawl in and out. Some Eskimos use driftwood in making their huts.

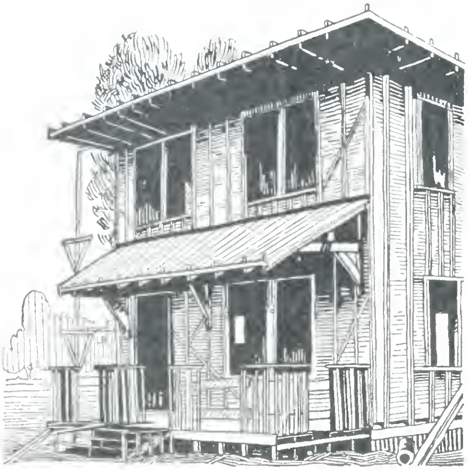
Even to-day in many countries the slaves live in bamboo huts, which are covered with grasses, earth, and the like. These huts are used mainly in tropical climates, as they help keep the people cool. In some parts of the desert of Sahara miners make their huts of blocks of salt. As there is no rain in that district, the salt is used for the roofs as well as the walls. In other mining districts materials such as iron are used in the building of huts. The Egyptians in the Nile valley live in huts of sun-dried bricks. In most of these huts the cooking is done outside, as the interior is low and small. Many of the inhabitants of the tropical countries live in homes which cannot be classed as huts. These are built of grass, cane and leaves. Besides being roomy, they often compare very well with our homes, so far as light and neatness are concerned. Some of these have an artistic quality due to the simple arrangement of the woven patterns which are frequently dyed in harmonious colors.

In the western part of China some of the people still live in caves. However, millions of the poorer people live in houses of mud, made of sun-dried bricks or of clay plastered over a framework of bamboo. Occasionally thatch is used for the roof, but clays or tiles are used more often. The better homes, however, are made of gray brick and are roofed with black or gray tiles. The



One type of Japanese house.

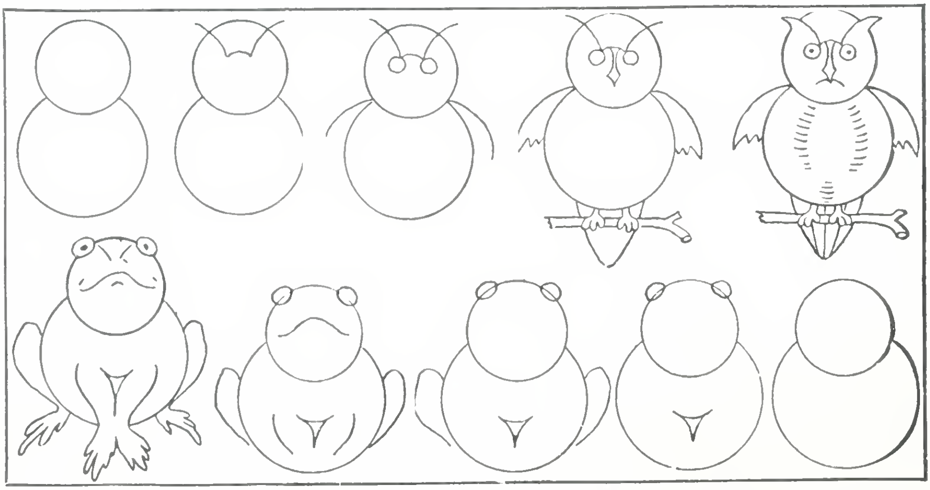
typical roof is of a heavy ridge shape, having its sides curved, as can be seen in the picture. It can be seen that the roof extends out beyond the walls of the house. The buildings of the Japanese people are often as delicately constructed as our best furniture. Their houses are built largely of wood and are roofed with either black tiles or thatch. Their roofs are usually made in sections which are placed in their proper places. The walls are so fitted into grooves that they slide back and forth, making several rooms into one. Some of these houses have their outer walls made in sections so that the whole house may be opened during the day.


A simple modern frame house under construction.

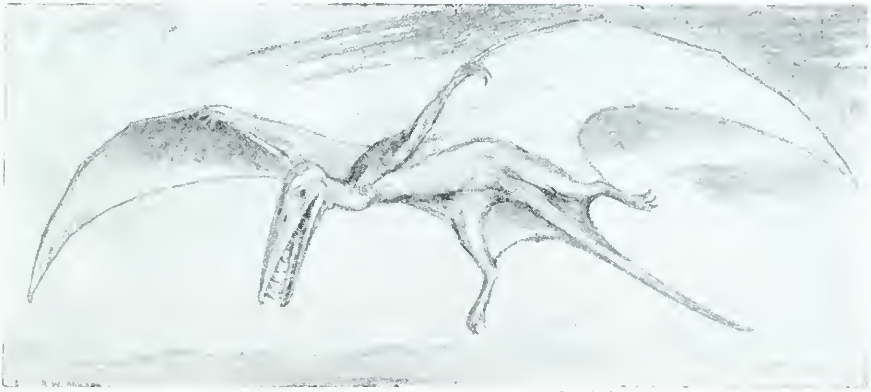
The American Indians lived in wigwams during the early days. These tents were made by sticking several poles in the ground so as to form cone shapes, which were covered with mats, grass and barks. Later, the Indians replaced these with deerskins, which were sewed and laced together. In many parts of the American colonies the people at first lived in tents and wigwams like those used by the Indians. But it was not long before they began to chop down trees, hew the logs into lumber, and erect them into cabins. The neighbors helped each other in putting the structure together and in raising the framework for the roof. Most of the cabins were built of logs notched near the ends and laid horizontally each one upon another. These were crossed at right angles and formed an oblong or square room, logs being added, layer by layer, until the house was of the desired height. Then the framework for the roof was raised into place. This was covered with thatch, clapboards or split shingles. The house was then made tight by filling all of the holes between the logs with mud and broken stones, after which the spaces were plastered with clay. The floor was made by pounding down the earth; or, in the better cabins, it was made by splitting and hewing logs. A large fireplace was built at one end of the cabin, forming a part of the great mud-and-stone chimney. These were the first permanent dwellings in the colonies.

Later sawmills were erected, and boards came into use. This was a much more difficult problem than that of felling the trees, cutting and hewing the logs, and placing these in the building of a house. After the trees were cut up into logs, they usually had to be hauled or dragged to a stream of water which would afford an easy means of transportation to the sawmill. When at the sawmill, the tearing saws and buzzing, groaning edgers and planes turned the large timbers into lumber. Each piece was now the desired shape and size, ready for the builders. The early frame houses were rather crude, but these grew more comfortable and beautiful, until we now have the modern frame house. The last of our pictures shows the usual construction of our wooden frame houses as they are planned and built to-day.

AN OWL AND A FROG MADE FROM CIRCLES


These pictures show you how to get an evening's amusement out of a pencil, a 50-cent and a 5-cent piece. Beginning at the left of the top row, we see how to build up an owl from two circles made by drawing a line round a 50-cent and a 5-cent piece; and the lower row, beginning on the right, shows how to make a frog.

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 1765.



The pterodactyl of the Cretaceous Period.

THE CRETACEOUS PERIOD

THE Cretaceous Period is so called because of the presence of white chalk in that part of the formation which appears in the south of England and the north of France, where it was first studied. But it must be understood that chalk is the exception and not the rule in this period.

The Cretaceous was a long period and is often divided into two, Upper and Lower. During some of the period a great part of North America was under water. Geologists say that during the Later Cretaceous the Colorado Sea stretched from the Gulf of Mexico to the Arctic Ocean. Eastern Canada and northeastern United States were not submerged, but the South Atlantic and the Gulf States were all under water, and much of the Pacific coast also. At one time the only land in the south above water was the mountains of North Carolina.

In England rocks of the Cretaceous Period are found only in the south and southeast; and typical examples of the white chalk of this period are seen in the white cliffs of Dover and the Needles of the Isle of Wight. But even in the south of England the rocks of this formation are not always of chalk. In many places we find clay and greensand. There can be no doubt that the chalk was formed on the floor of a shallow sea, and that the sand and clay were at one time the delta of a great river.

At that time a great river must have flowed southward through England, which was then part of the continent, and most of Kent, Sussex, Hants, Dorset, Isle of Wight, Wiltshire, Essex and Norfolk were built up in the sea out of the mud deposited by this great river. So huge was the river that its delta must have extended at least a hundred miles from north to south and two hundred miles from east to west, and must have covered an area of about twenty thousand square miles. In Sussex the mud is found as much as two thousand feet deep, and in Dorsetshire it has been estimated at eighteen hundred feet.

Sir Charles Lyell calculated that the great river flowed all the way from the lost continent of Atlantis, so that, if he is right, Englishmen may boast that part of their soil was long ages ago the soil of that lost mysterious continent.

During the Cretaceous Period most of Europe was under water, and in the water the rocks were being deposited either as sandstone, clay or chalk, so that we find Cretaceous rocks in detached areas over most of the continent, giving a record of the seas, lakes and rivers of the period. A map of Europe at that time would show the greater part of Spain, Italy, and the whole of Belgium, Holland, Prussia, Hungary, Switzerland, Rumania and north Russia and of western United States as an almost continuous sheet of water.

THE ARMY OF TINY WORKERS THAT BUILT UP THE CLIFFS OF DOVER

Cretaceous rocks are found not only in Europe but all over the world—in the Arctic regions, India, Japan, North America, South America, Australia and New Zealand. In California there are strata of Cretaceous rock thirty thousand feet thick. During parts of the period the seas were very shallow, and some of them became fresh. The rich coal beds of Alberta were laid down during this period.

The chalk rocks, like most other limy rocks, are composed of the limy shells of myriads of sea creatures mostly microscopic. If a little chalk is ground up with water it will be found to be full of these tiny shells (foraminifera), so small that about two thousand placed end to end stretch only about an inch. A cubic inch of this chalk will contain thousands of millions of shells. The seas of the period must have been swarming with these tiny sea creatures, and in the course of ages they accumulated on the floor of the sea and formed the white cliffs of Dover and all the other chalky rocks that we see now in the Cretaceous System.

The vegetation of the Cretaceous Period is of special interest, for at this date appeared most of the trees of the present day. In the beginning of the period the plant life was very much like the plant life of the preceding period; horsetails, ferns, cycads and conifers abounded, and there were no dicotyledons, but in later Cretaceous times dicotyledons are found. Trees very much like our poplars, oaks, willows, planes, beeches, palms, ivy, and many other modern trees are found in the deposits. The climate during the period was warm and moist, and vegetation was probably rich and luxuriant.

Even in the Cretaceous rocks of north Greenland nearly two hundred species of plants have been described, and in North America more than a thousand.

THE STRANGE AND COLOSSAL REPTILES THAT ONCE LIVED IN THE SEA

In the sea there were myriads of foraminifera, and the flints in the chalk show that sponges were also plentiful. Starfish, sea-urchins, corals, polyzoa and crustaceans also abounded; voracious sharks and dogfish were quite common.

The Cretaceous Period, like the Jurassic, was an age of great lizards. One of the most interesting of these is the Mosasaurus, which, when first discovered at Maestricht in 1780, was a great puzzle to the naturalists. At various times it was considered a fish, a whale and a crocodile; it was left for the genius of Cuvier to identify it as a reptile. The mosasaurus first found was only twenty-four feet long, but specimens have since been discovered about seventy-five feet long. These great creatures had fin-like paddles with which they propelled themselves through the sea. Like snakes, they had sharp teeth on the tops of their mouths, while their enormous jaws were jointed in such a way as to allow them to gape horribly and to swallow tremendous morsels. They must have been formidable creatures.

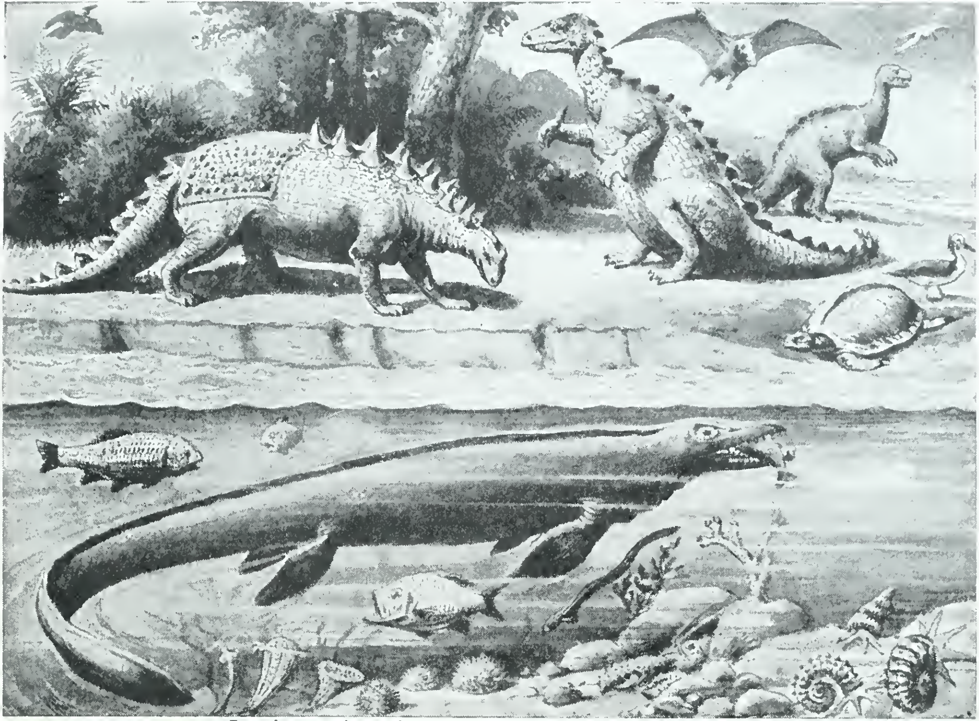
An amazing creature, too, was the Elasmosaurus, which has been found in the chalk deposits of Kansas. It was sometimes fifty feet long, and twenty of this was a slender neck. It has been said that it probably often swam many feet below the surface "raising the head to the distant air for a breath, then withdrawing it and exploring the depths forty feet below without altering the position of its body."

QUEER CREATURES LIKE KANGAROOS, AND BIRDS WITH TEETH

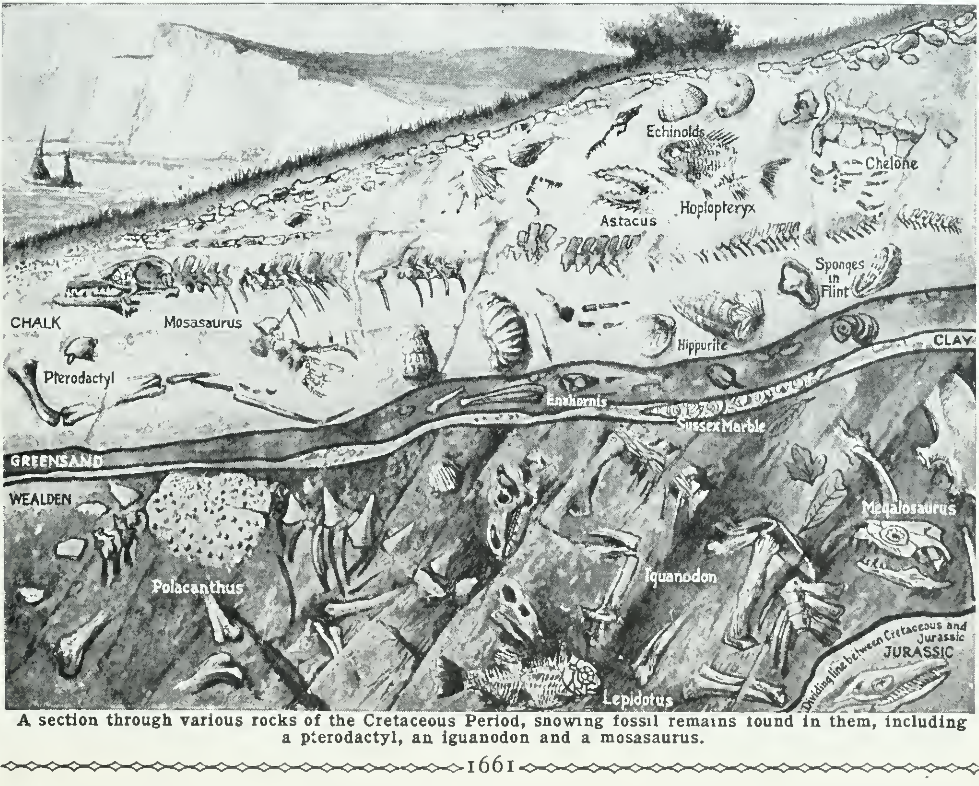
The Iguanodon may perhaps be considered the most characteristic animal of the period. It was first discovered in the Cretaceous rocks of Sussex; but no less than twenty-nine of them were found in a Belgian coal-mine. It was a herbivorous animal, thirty or more feet long from nose to tip of tail, and it walked on its hind legs like a kangaroo. In the Royal Museum in Brussels nine skeletons of these strange creatures are mounted in one room. Perhaps the strangest creature of the day was the Triceratops, a dinosaur with a skull seven feet long armed with three horns, and with a brain that seems to us absurdly small. Besides the pterodactyls there were a few true birds, some with teeth. Small mammals, mostly monotremes and marsupials, have been found in the Cretaceous rocks of America, but none in Europe.

THE NEXT STORY OF THE EARTH IS ON PAGE 1783.

LIFE AND REMAINS OF THE CRETACEOUS

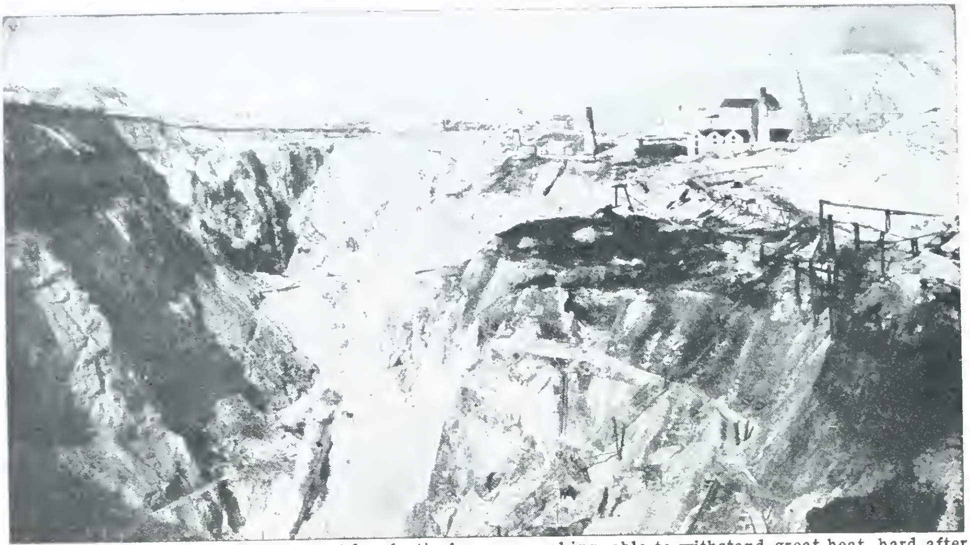


Imaginary view of the world in the Cretaceous Period.

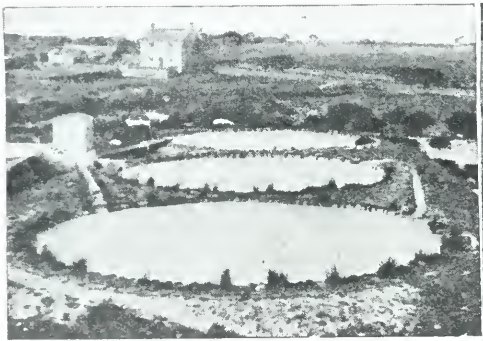

Echinoids
Chelone
Hoplopteryx
Astacus
Sponges in Flint
CHALK
Mosasaurus
Hippurite
CLAY
Pterodactyl
Enaliornis
Sussex Marble
GREENSAND
WEALDEN
Megalosaurus
Polacanthus
Iguanodon
Dividing line between Cretaceous and Jurassic
JURASSIC
Lepidotus

A section through various rocks of the Cretaceous Period, showing fossil remains found in them, including a pterodactyl, an iguanodon and a mosasaurus.

WHERE THE CHINA COMES FROM



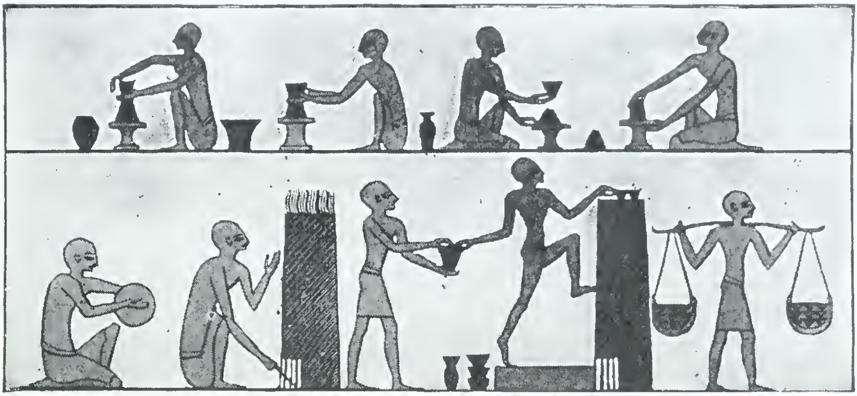
The material for making pottery must be plastic for easy working, able to withstand great heat, hard after baking, and white when finished as table or decorative ware. China clay, or kaolin, is found in pits.



The granite rock from which china clay is derived is crushed and washed, and allowed to settle.

Iron particles in the mixture which would make brown specks in the ware are drawn out by magnets.

That the materials in the clay may be thoroughly mixed, it is put through a pug-mill, where it is kneaded into a uniform paste, rolled out, and cut off, as we see here, in pieces suitable for the potter.



These pictures show an ancient Egyptian potter carrying out the different processes of his trade.

HOW CHINA CUPS AND SAUCERS ARE MADE

AMONG the most useful of the familiar things of our daily lives are the crockery cooking utensils which we use so freely in our kitchens, and the prettily decorated dishes which make our dining tables so fresh-looking and attractive. Just because they are so commonly used, and because they are so easy to get, we seldom stop to think how they are made, or whose inventive mind first thought of fashioning an earthen vessel. And yet, the manufacture of the pretty cup and saucer, or the simple blue-and-white jars which help to make the kitchen bright and homelike, and the materials of which they are made, have a long romantic history behind them.

Part of the material has come from the foundations of the earth itself. Millions of years ago mountains of granite or similar stone were formed. In the ages that have long passed away the material of which these mountains were made was separated into its parts, and some were made into powder by hot gases or by the weather. This powder was carried down and settled on low-lying lands, to form the fine white clay called kaolin, without which none of our beautiful fine porcelain can be made. It is not, however, necessary to use this clay in the making of all earthenware or pottery. Some very good pottery is made from fine colored clays, and a great deal of coarse earthenware is made from clays which, although they will not make fine pottery, are still plastic, that is, the clay can be molded or modeled.

The making of pottery is one of the oldest arts known to man. It is so ancient that no one knows what people first learned to make vessels of clay. In our great museums we may find well shaped bowls and vases which were buried in the tombs of the Egyptians perhaps six thousand years ago, and which have helped us to learn something of the state of civilization in Egypt long before the time of Moses. The ancient Cretans and the Greeks made wonderfully beautiful jars and vases thousands of years ago. The Assyrians and the Persians were noted for skill in this work, and Roman pottery has been found everywhere within the limits of that great empire. The Egyptians knew how to make a beautiful glaze for their pottery thousands of years ago. Some students think that they were the first people to learn the art of glazing, and that it was taught by them to the Babylonians and Assyrians. It is believed that the Greeks knew nothing about glazing.

THE MAKERS OF POTTERY IN THE MIDDLE AGES

As we have learned, the civilization of Greece and Rome was almost swamped for a time by the rush of barbarian peoples from the north. These peoples knew little about the making of pottery, and the potter's work that was done in Europe in medieval times was very crude. The knowledge which had been gained during centuries by the Egyptians, the Greeks, the Assyrians and Persians had not been lost, however, for it lingered on among the Egyptians and Syrians. After the Moslem conquests the art was revived, and beautiful pottery was made by some of the Moslem peoples.

When the Moors overran Spain they brought with them skilled workers in various crafts, among whom were potters. Knowledge of the art of these Moorish potters soon spread through Europe. Potters of other nations were quick to learn it and improve upon it, and soon potteries sprang up in other countries. Many beautiful things were made, especially in Italy, but they were made from heavy clay, and the "paste" under the beautiful decorations and fine glaze was thick and coarse.

THE CHINESE WERE THE FIRST MAKERS OF FINE CHINA

Long before this time the Chinese, working by themselves, had learned to make very beautiful pottery. In their search for fine clay they discovered deposits of kaolin. From this they made fine porcelain, as early, probably, as the time during which the Norman kings reigned in England; and when Chaucer was riding to Canterbury with the pilgrims Chinese potters were making the exquisite wares for which kings' ransoms are paid with cheerfulness to-day. The Chinese taught the art to the Japanese, and no other people have yet been able to outdistance these nations in the making of fine porcelains.

CHINESE PORCELAIN WAS BROUGHT TO EUROPE AND IMITATED

It is said that Chinese porcelain soon found its way to Western Asia and Northern Africa and that it was brought to Europe from Cairo as early as the twelfth century. Eager efforts were made to imitate it, but for a long time they were not successful. The trouble was that the European potters did not know what clay it was that gave the Chinese porcelain its beautiful whiteness and clearness. It was not until the year 1710 that it was discovered by a chemist named Böttger, who found it, it is said, in the clay used to whiten his wig. Böttger lived at Dresden, but afterward moved to Meissen, where the famous Dresden china was made. He tried to keep his discovery secret, but in vain. In a few years porcelain was made in other countries of Europe, and French and Austrian porcelain also became famous. It received its common name of china because it was first made in that country.

Before the end of the eighteenth century a new kind of porcelain was made in England. One experimenter found that powdered flints made an excellent addition to the kaolin and other materials used. Another got the idea of adding to the mixture a white powder made from burned, or calcined, bones. It was found that in this way a beautiful soft paste could be produced, and this English, or "bone china," as it is frequently called, proved so satisfactory, and could be made so cheaply, that its use soon spread. It is now made in large quantities in Europe and is also made in America.

TWO OF MANY FAMOUS ENGLISH POTTERS

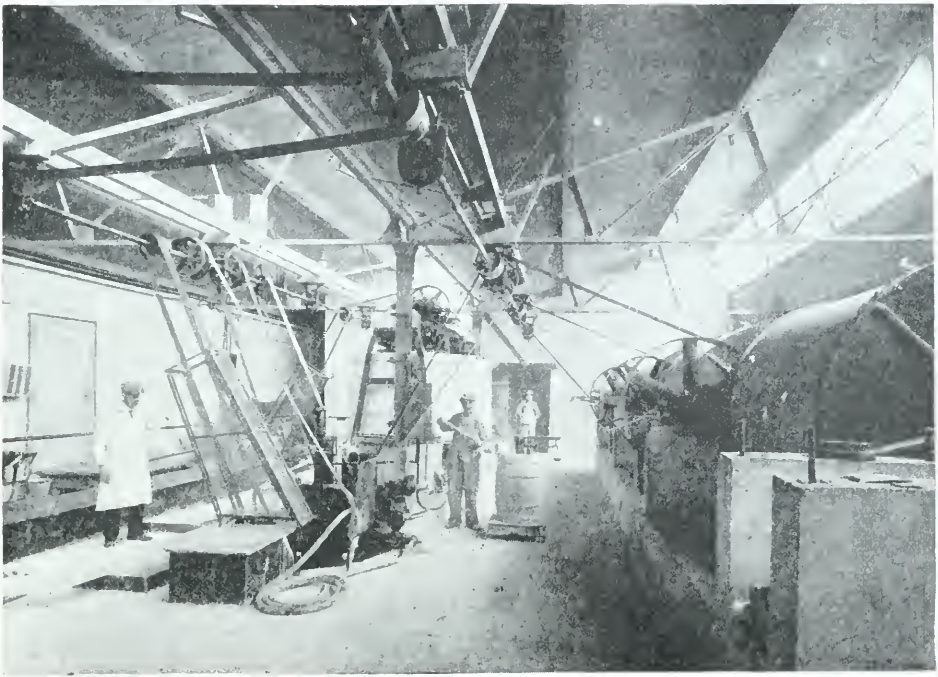
Perhaps the most famous of English potters was Josiah Wedgwood, born in 1730. He built up a great business, making not only excellent table-crockery, but also artistic porcelain. Before his death Wedgwood ware was known throughout the world.

In the middle of the last century Henry Doulton, a famous English potter, devised a way to make the earthenware drain pipes which are of so much use in carrying off poisonous matter and making our towns and cities healthful and comfortable. The new invention proved to be a boon to the world, and great potteries are now engaged in making immense numbers of these pipes. Until they came into use, the best drains were built of brick, which allowed the sewage to leak through and spread its poison in all directions. Sir Henry Doulton made many experiments, and the Doulton Works continue to make much fine ware.

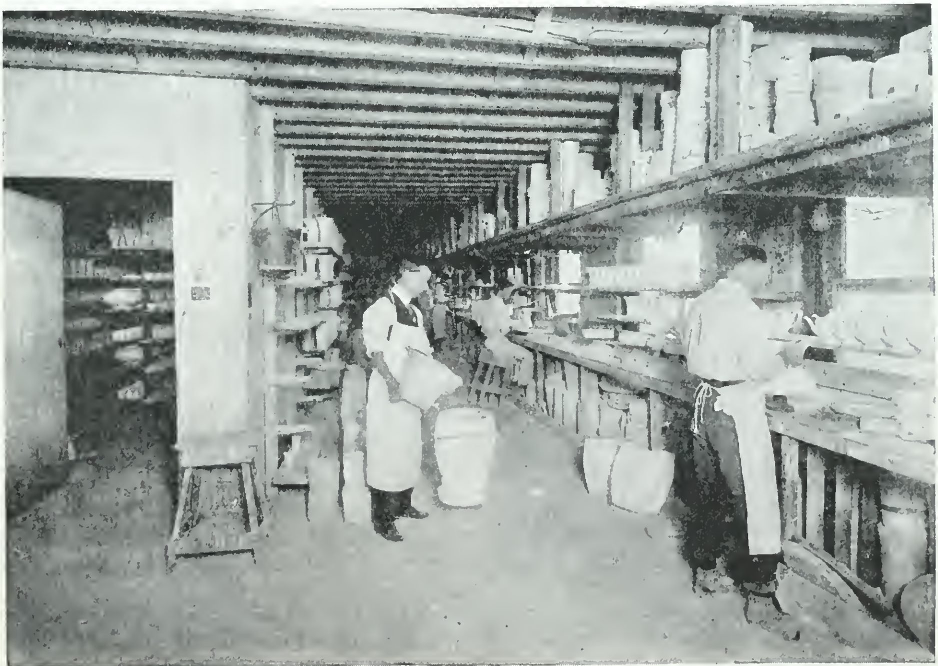
BEAUTIFUL PORCELAIN IS MADE IN THE UNITED STATES

For a long time the china made in the United States was all of a heavy kind,

MIXING CLAY AND MOLDING PORCELAIN



The materials from which porcelain is made are carefully weighed, mixed with water and ground in flint-lined steel mills. In each mill about a ton of large flint pebbles grind against the square flint blocks of the lining, and as the mill revolves, the china mixture is ground and beaten between pebbles and lining. After several days of grinding, the mixture comes out a smooth, creamy slip, or paste.



Porcelain is made by filling porous molds with liquid slip and allowing them to stand until a deposit forms inside. When the deposit has become sufficiently thick to make a vase or teacup, the rest of the slip is poured off, the inside is smoothed down, and the mold dried. It is then opened, and the vase or teacup is ready for handles or handle, which have been made in separate molds.

but great advances have been made. A great deal of pretty porcelain and good earthenware is now made in states where suitable clay is found. Several potteries are famous for the beauty of their vases, jars and lamps, and some of the fine American bone china for table use is equal to the finest porcelain made in the Old World. American potteries are chiefly noted, however, for large articles for household use. The glistening white ware that makes our bathrooms a delight, wash tubs and other things that make life easier for the housekeeper, are made in many places throughout the country.

HOW THE CLAY IS MADE READY FOR USE

Many things happen to the clay after it has been taken out of the ground, before it is ready to make a dainty cup and saucer, or a graceful vase, or any of the numerous other things for which earthenware is used. To take out any sand that may be in the clay after it is quarried, it is mixed with water and strained through a fine sieve into a tank where it is allowed to settle, and the water is drawn off. The clay is then put into filters, the water is pressed out, and the clay is ready to be shipped to the pottery. It is not yet ready for the potter, however, and the processes through which it has to go depend upon the use to which it is to be put.

To make fine bone porcelain, the kaolin is mixed with feldspar and with powder made from powdered flints and burned knuckle-bones of sheep. Water is added to the mixture, and it is ground and beaten and turned over and over by machinery for days, until it is a smooth creamy paste, or "slip," and so plastic that it can be molded into any shape. When it has reached this state it may be used at once, or it may be filtered and pressed again, and folded away in a dark place for later use. Some potters put it through still another mill to press out any air that may be in it. In hard porcelain, such as the Chinese make, no bone is added, and in this case larger proportions of some of the other materials are used.

HOW PORCELAIN IS MADE FROM THE CLAY

Valuable vases, and many other things, are still made on the potter's, or throwing, wheel. This is a contrivance which was probably used in Egypt six thousand years ago and has been very little altered in principle since. The potters of Babylon and Nineveh used wheels very much like it, even before the Bible was written. The throwing-wheel is a disk which revolves horizontally in a pan. The pace at which it moves is fixed by a brake which the potter controls. The wheel is still sometimes worked by the potter's foot, but most of the wheels used in large potteries are worked by machinery, and some of them by electricity.

As the throwing-wheel spins round on its axle, the potter throws the clay, which sticks to the wheel and goes round with it. Then the art of the potter comes into play. As the wheel spins he presses, and pulls, and molds it with his skillful hands or with tools made for the purpose. He works from the base upward, shaping the walls, making them the right height and thickness, and gradually the clay takes on the desired shape. When it is finished, the vessel is set aside to dry, so that it can be fixed on a lathe, and turned and smoothed.

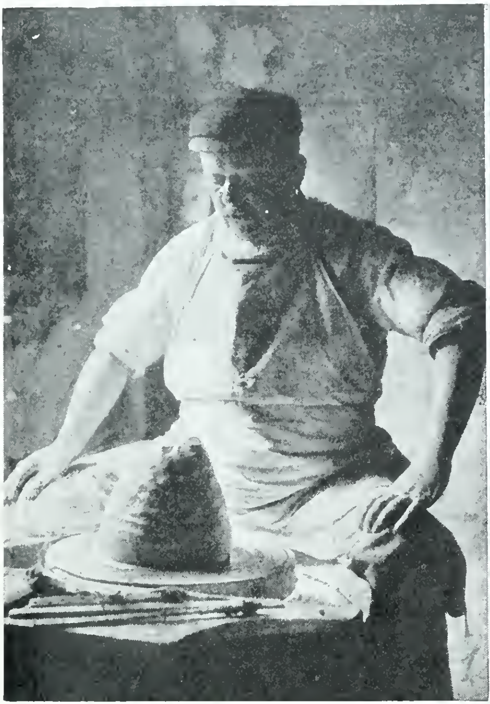
Some plates, as we see in the picture, are made on a wheel. Others are made in a mold which the potter fixes to his throwing-wheel. This mold, filled with clay, is spun round on the wheel; an arm presses down upon it, squeezes the clay to the shape of the mold, and then pares it down to the proper thickness. Heavy cups are also made in such a mold, or, in some places, are thrown on the wheel. Thin, translucent cups and bowls, however, are cast in porous plaster molds, into which liquid slip is poured until they are full to the brim. The water in the slip filters through the mold, leaving a thin lining of clay. After this has reached the desired thickness, all the liquid slip that remains is poured off. The mold is then placed on a kind of wheel so that the inside may be worked into its proper shape. When this is done, it is put into a warm place to dry, and out of the mold comes the cup, or perhaps a cream pitcher or teapot, ready for handles or spouts, which have been made in separate molds.

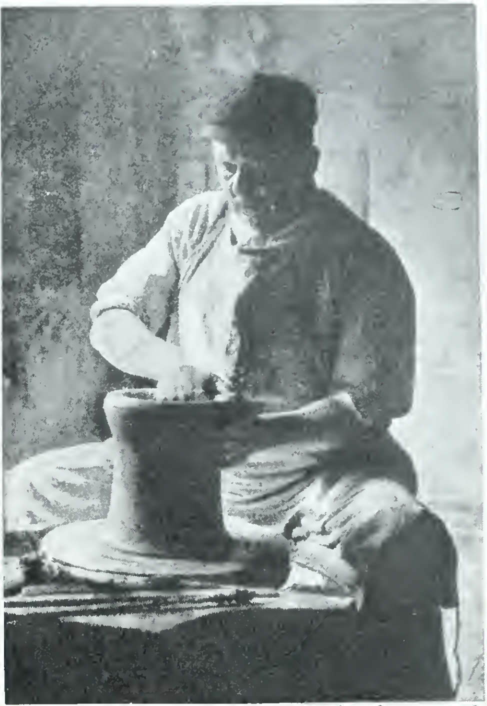
THE BURNING OF THE CLAY VESSELS INTO PORCELAIN

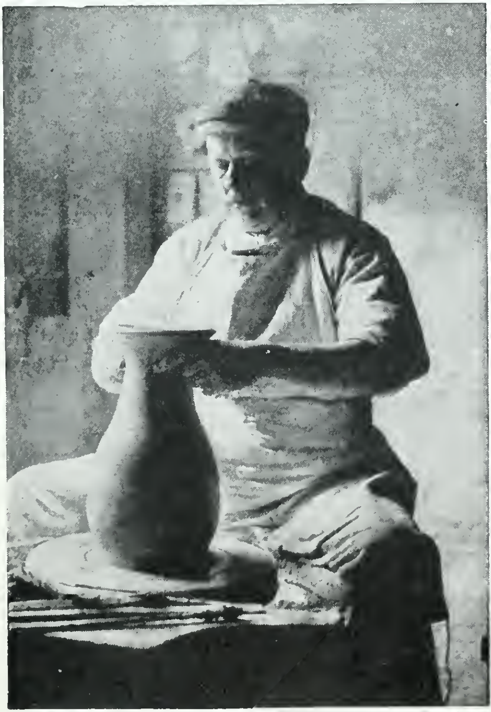
After the clay has been shaped, the vessels are put in a drying room, and then comes the difficult part of porcelain-making—the firing or burning of the clay to make it into porcelain.

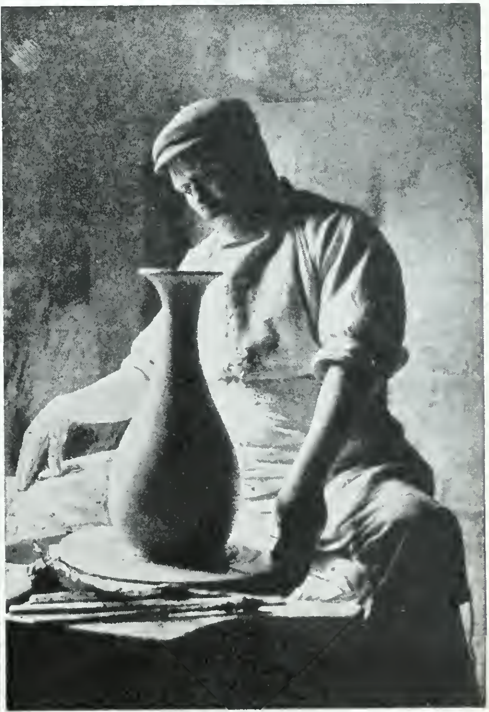
For this purpose the china is packed into closed earthenware vessels called

THIS IS HOW A VASE IS MADE


Under the skillful fingers of the potter the shapeless clay on the wheel becomes a thing of beauty.


Spinning his wheel and working the clay up and down, pressing inside and out, he forms a cylinder.


Gradually he draws upward and outward the revolving mass till it begins to take the shape of a ewer.


The wheel spins again, and under the nimble fingers and the artist's eye, the lump of clay is transformed.

saggers (or seggars, as the word is sometimes spelled) in such a way that they will not touch each other. The saggers are packed into the kiln, and when it is full, the openings are closed up with fire bricks. Then fires are lighted and the heat is carried up all round the saggers, at first slowly, and then more rapidly, until the inside of the kilns has reached an almost unimaginable temperature. The kiln is kept at this temperature for about ten hours. It is then allowed to cool so gradually that it is three or four days from the time they were put in before the saggers are opened and the "biscuit," as it is now called, is taken out.

Before they are put into the kiln in which they are burned, our cups and saucers and other things made of china are packed in the earthenware vessels called saggers, or seggars, which we see here. The machines in the corner press the clay from which the saggers are made into the shape that the potter desires.

Photos on pages 1665, 1668, 1670, 1671, courtesy Lenox, Inc.

HOW THE TRANSPARENT GLAZE IS MADE

Meantime in another part of the pottery a glaze has been made by mixing together materials which will make glass, and baking or firing them in the kiln until they become a solid piece of glass. This is ground up to a fine powder under heavy stones, and mixed with water to what is called the glaze slip. Into this our cups and saucers are dipped so skillfully that every part is evenly covered with the glaze. They are then again placed in the saggers and put back into the kiln. The furnace fires are relighted, and the temperature is again raised to a high point and kept there for many hours, until all the materials in the glaze are well fused and the porcelain is covered with a delicate, shining coat.

The china is now ready for the decorator, who paints on it flowers, or figures, or designs, if it is very good china. If it is of poorer quality, it is not painted: the designs are pressed on it from transfer paper. After it has been decorated, the china is again baked, or fired, to set the colors. Often the china is decorated before it is glazed, and we then speak of the decorations as being "under glaze." Many people buy plain white porcelain and paint and fire it themselves.

Some kinds of common earthenware are not dipped in glaze, but receive what is called "salt glaze." As soon as the heat of the kiln in which this pottery is being fired has cooled down to a certain point, the saggers are opened and a quantity of common salt is thrown in. The salt, which, as we have learned, is sodium chlorid, is turned into vapor by the heat. When in this state it divides into its separate parts, and as the oven cools, the sodium settles down on the articles in the form of a transparent glaze.

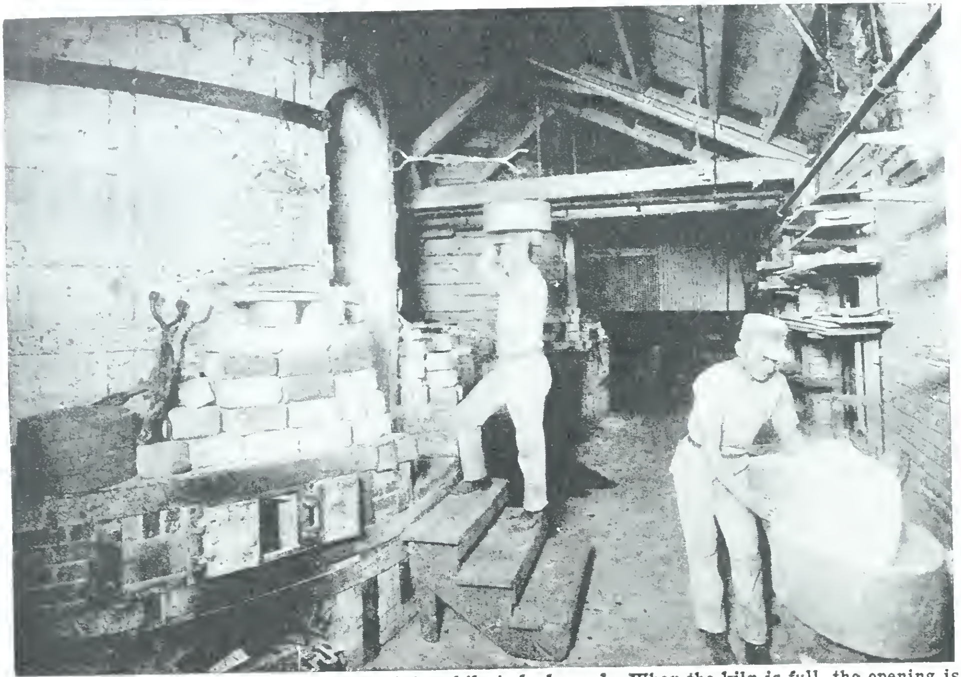
THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1795.

HOW THE DINNER PLATE IS SHAPED

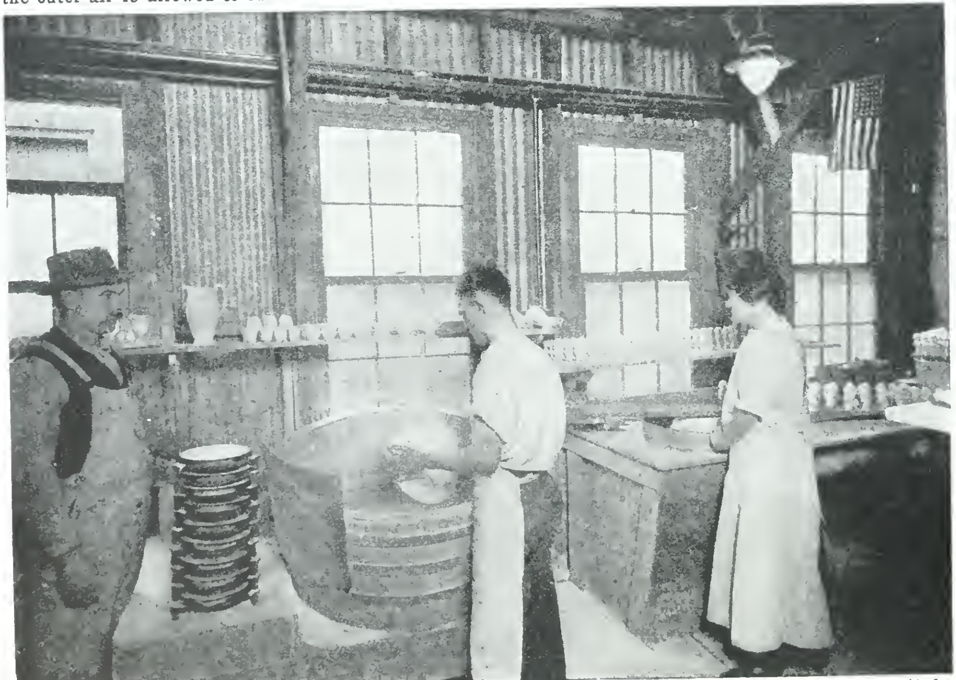
Much china is made by pressing and casting. Pressing is making hollow ware, like soup tureens, in a mold. In casting, liquid clay is poured into molds. Here a girl is stamping out small shapes.

When many articles, like dinner plates, are to be of the same size, the potter shapes them from the damp clay in a machine. He then carefully trims them, and they are taken away to the drying stove.

HOW PORCELAIN IS BURNED



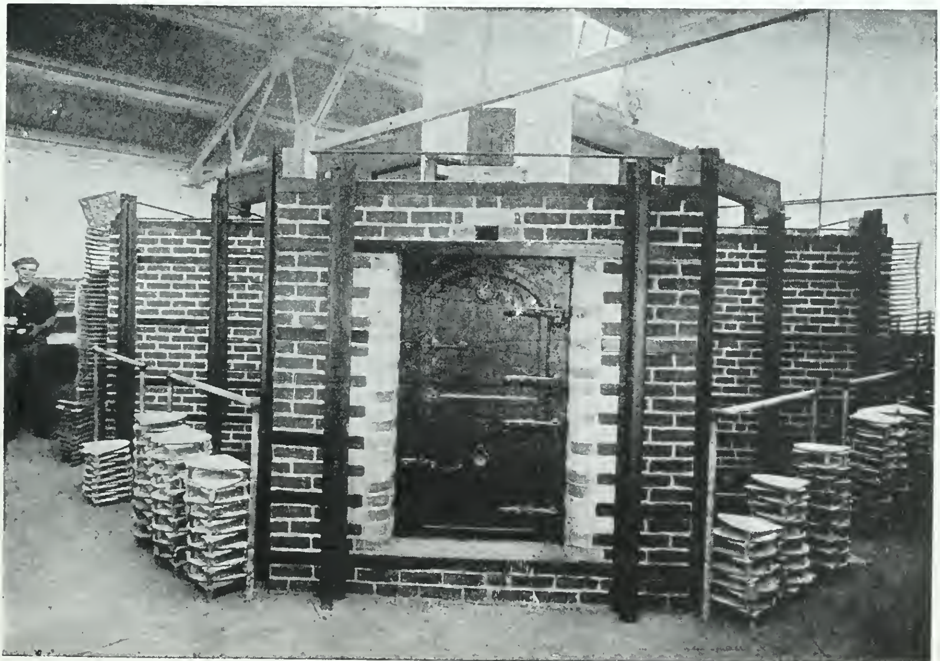
Here we see men putting china in saggers into a kiln to be burned. When the kiln is full, the opening is filled with the bricks and clamped with iron bands. The firing process takes a period of from twenty to thirty hours, while twenty hours are required to cool off the kiln before the bricks are removed and the outer air is allowed to rush in. Great care and skill are required in the firing.



After the kiln has cooled, the china, now known as biscuit, is drawn out and cleaned to prepare it for the glaze, which has been prepared from materials which will make glass. Each object is evenly covered by skillfully dipping it in the glaze. The china is arranged in the kiln so that the things do not touch; the fires are relighted and the temperature is brought up to a point that will fuse the glaze.

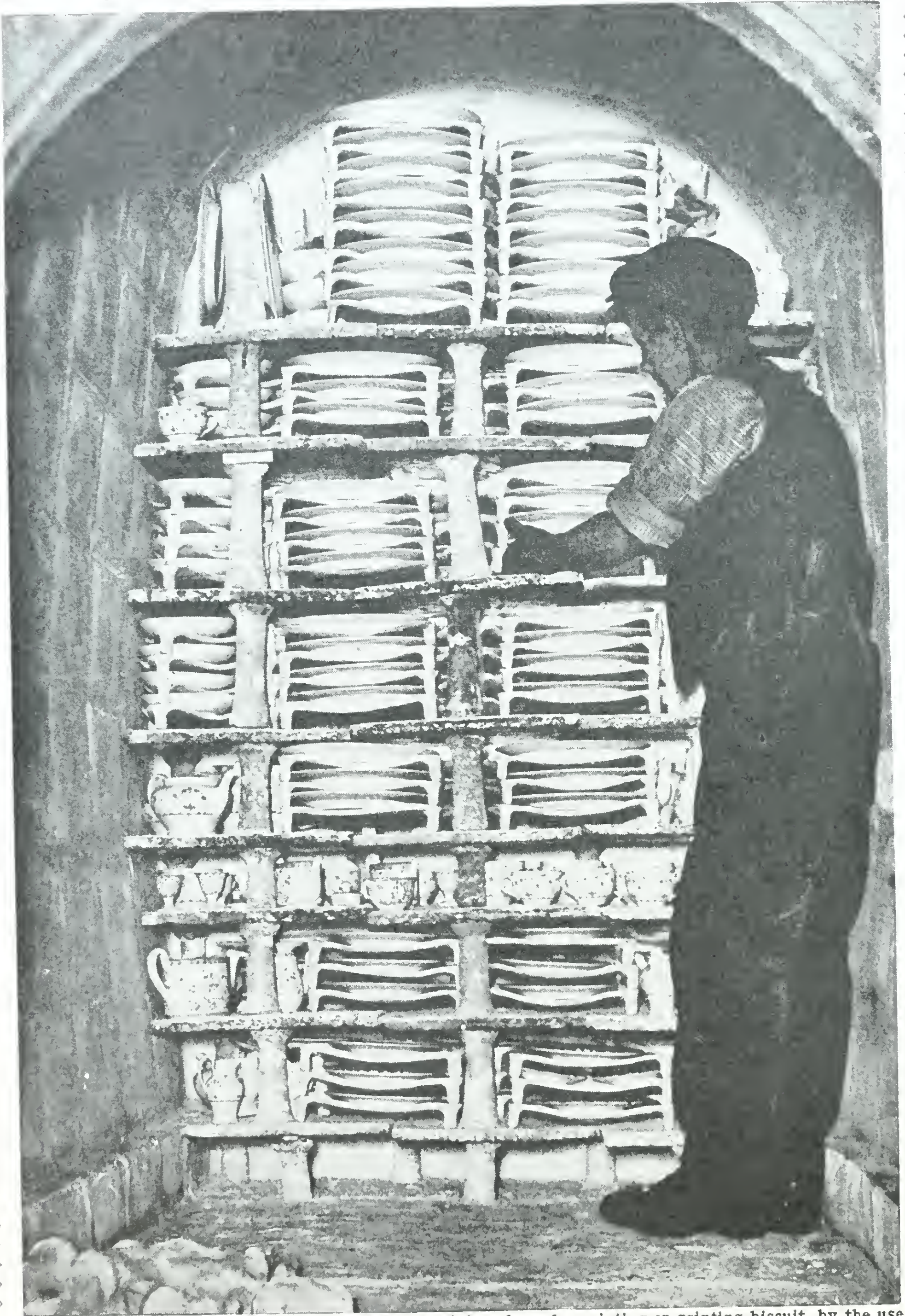
THE DECORATION OF PORCELAIN

When the glaze has been fired, the porcelain is ready for the decorators. Cheap, heavy cups made in a mold are decorated with transfers, but fine porcelain is painted with flowers or designs, or tinted all over. Often the china is decorated before it is glazed, and we then speak of the decorations as being "under glaze." By looking at your china you can easily tell how its decoration has been done.

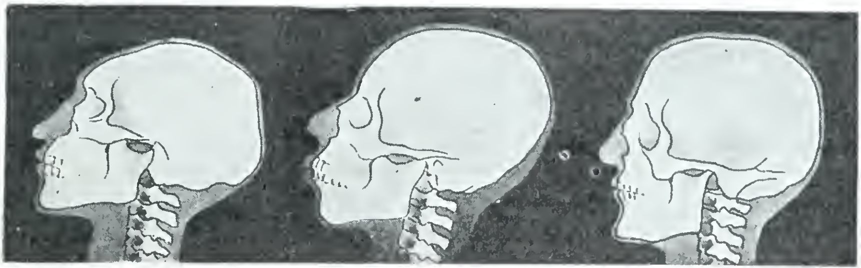


After the porcelain has been decorated, it must be fired again in a small kiln like this to fix the colors. Nothing like the same degree of heat is needed, however, and so the kiln is not so strongly built. Just as much care must be used in this firing as in the others, for the minerals used for the colors—cobalt, iron, copper, manganese, gold and so on—are of course strongly affected by the degree of heat used.

AN OVENFUL OF PAINTED CHINA



Beautiful decorative effects may be obtained by staining clays, by painting or printing biscuit, by the use of colored glazes, by enamels put on the glaze, and by metallic or lustre decoration. Enamel colors on the glaze are fired in a big kiln. The pottery is placed on brick or iron shelves, and kept at a very high temperature for 10 to 12 hours. This picture was made at Minton's potteries.



In animals the skull is all behind the face. These pictures show how the skull has doubled over in front to make room for the brain. The first is the skull of an Australian native, the second of an African, and the third, the highest type of man.

THE HEAD AND THE LIMBS

WE have read about the bones in general and their services to the body. Especially we discussed the backbone, upon which the whole body is built. We saw that it is specially curved in human beings, so that, after leaving the baby stage, we walk erect. Upon this backbone the head is beautifully poised, and this contains the brain, where *we ourselves* really live. Let us study the head.

If we look at a very humble backboned animal, like the fish, or even at a much higher one, such as the dog, we see that the head is made in two parts. In front there is a part which is thrust forward, which we call the face. Its great business is to carry the most important organs of the senses—the eyes and the nose. And behind the face is the other part of the head, rounded and rather large; we call it the skull. It is the most important part of the whole skeleton, for it contains the brain. The brain of a fish is very small, and its skull is small also; in the dog the brain is larger, and so its skull is quite conspicuous. In the man-like apes the brain and the skull are larger still. But even in the highest apes the skull is still *behind* the face.

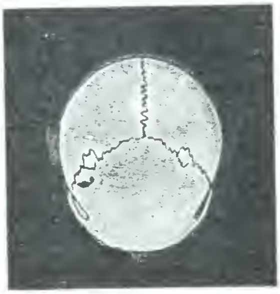
In ourselves the brain is enormous compared with the brain of an animal, and room has been found for this great brain. More than all things else, the brain is the thing which distinguishes our bodies from those of any animal. Our skulls stand out sideways from the neck, but the wonderful development of the brain in ourselves is most marked in one particular part of it. This is its topmost part—topmost both because it is actually at the top and because it does the highest kind of work, which is thinking.

This topmost part of the brain has grown so large and so high that it has moved forward instead of standing straight up; and therefore the skull of mankind has had to grow forward to hold it. This means that the skull, which in animals is entirely *behind* the face, has in man grown over the face. If we look at any man, woman or child we see at once something which shows this, and that is the great forehead—the part of the head that has "come to the fore," as we say. So, while we still have a great expanse of skull behind our faces, we have a great part, the most important of all, placed above the face. The whole growth and development of the body, as well as everything else, depends on the brain; and so if we look at a young baby we find that, though its brain has yet such a lot to learn, it is larger in proportion than any other part of its body.

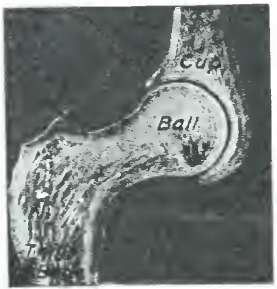
So the baby's face seems rather absurdly small, tucked away "anyhow" under the big skull, which is actually the widest part of the whole body of a baby. If we look at ourselves and see how narrow the head is, compared with the shoulders or the hips, we can scarcely believe that when we were born the head was wider than either. But so it was, for it had to hold a brain big enough to control and direct the growth and development of the little baby's body.

We find that some parts of the earth are inhabited by a humble kind of men and women who not only know less than we do but are not able to learn as much as we do, even when they get an equal chance. We notice that these people do not have high and broad and straight foreheads, but that their foreheads are long and narrow, and slope very sharply backward.

We have no more right to despise these people than we have to despise any other creature that God has made. To do so is to despise God. But we must understand that they are less able to look after themselves and to protect themselves from evil things than we are, just because their brains are not so large as ours. Therefore a special duty falls on us, who have larger and better developed brains, to do right to these people, the backward races of the earth, and not, for instance, to get rich by making slaves of them or by selling to them alcoholic liquors which are notoriously unfit for any human beings to drink.



The top of our skull seems one bone, but is really several bones, so dovetailed together that it is easier to break the skull than disjoint the bones.



We can move a finger in only one or two directions, but the hip-joint shows the ball-and-socket plan which enables us to move our legs in all directions.

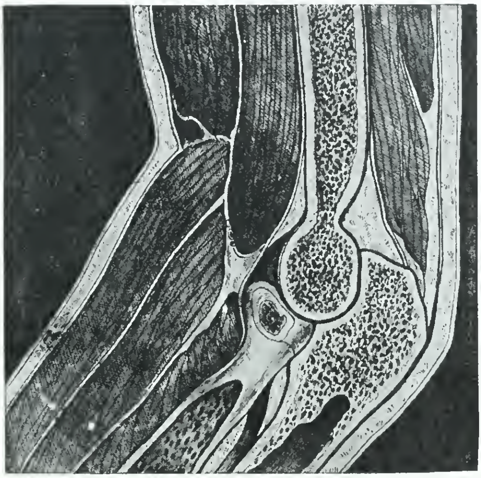
If we understand how important the brain is, and that the skull is its house, we shall think it worth while to study the skull rather carefully. First of all, a word as to its base. If we look at it we notice two things. The first is that it is very strong and very thick, and made, in its greater part, of the densest and hardest bone in the body. Part of it is called the *petrous* bone, from the Greek word for "rock." The reason that the base of the skull is so tremendously strong is that it always has to bear great shocks. Every step we take—and far more so when we run or jump—means that a great shock runs up our legs, along the backbone, and so reaches the base of the skull. If this were not so strong as it is, it could not stand these constant shocks. As it is, only the most terrible accident will break it, and usually it is unbroken even when a man has had an awful fall from a height.

The second thing we notice about the base of the skull is that it is pierced with holes, small and large. They are so many and so confusing that it takes months to know them all. But there is one that nobody can forget. That is the great hole through which the brain runs into the spinal cord. The other holes exist partly for blood-vessels to enter the skull and supply the brain with air and food, for veins to carry the used-up blood away from the brain, and for a host of nerves to travel to and from the brain and connect it with the face, the tongue, the lips, the nose, the eyes, the ears, the voice-box and many other important parts of the body.

Only in one or two places do we find that the brain rests on a floor of bone which does not protect it thoroughly. The wall of the space which holds the eyeball is, however, one of these places. It is possible for such a thing as the point of an umbrella very easily to pierce this thin plate of bone and so enter the brain at one of its most important parts.

The great vault of the skull is composed of a very special kind of bones. These bones are thin and beautifully curved, and are most exactly jointed to one another. These are among the few cases in the body where bones are jointed together but are not meant to move at the joints. Most bones in the head do not move. The only exceptions are the joints where the lower jaw hangs from the head, and the joints of certain tiny bones inside the ears which carry the sound-waves from outside on their way to the nerves of hearing. The bones forming the vault of the skull will always break sooner than be disjointed from one another, or dislocated, as we say. These bony plates are remarkable, because they are formed not from gristle or cartilage, as most bones are, but from fibrous material, or membrane.

When a baby is born, and for a long time afterward, there are at least two places in its skull where this membrane has not been changed into bone. There is a "soft place" in the baby's skull. The existence of the brain would be very risky if all its covering were made of a soft membrane instead of good, firm bones. This soft place was long ago called the "little fountain" by the Italians. Sometimes, if we look at it, we can see it quickly rising and falling, rather like a fountain. The reason is that at every beat of the heart the brain and skull are filled with a little more blood than is in them between the beats. This expands the brain a little at every strong beat of the heart. Sometimes a baby's pulse can be felt here when it cannot be felt anywhere else. This part of the baby's skull must be very carefully protected from injury or pressure.


The elbow-joint, showing how the bone of the upper arm fits into the two bones of the forearm.

We find that each of the bony pieces that make up the vault of the skull begins to form in the centre of the piece of membrane that corresponds to it. Even in the head of a fully grown-up person these places can be felt as "bumps," for the bone is a little thicker there than it is anywhere else. These bumps have nothing to do with the character or career of anybody.

You will be able to feel five bumps at least on your own head. On each side of the forehead there is one; at the opposite corners of the head are two others, and these are the places where the side bones of the skull started to be made; and in the middle line of the skull, behind and low down, is the sharpest bump of all. This is of a different kind, though it is a true bony bump. It is a sharp piece of bone meant to hold the muscles and strong elastic fibres of the back of the neck, which hold up the head. They prevent the chin from falling on the chest, as it does when anyone is very sleepy and his brain forgets to tell the muscles at the back of his neck to keep on pulling.

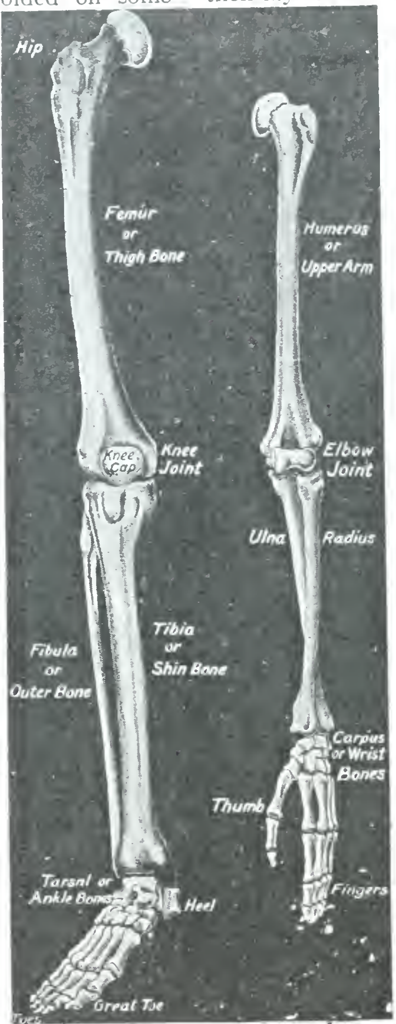
In spite of these bumps the skull of a human being is very smooth compared with some skulls. The skull of a cat or a tiger has many ridges and crests and bosses of bone on it. The reason is that the tiger lives largely by the strength of its jaws. These need very large muscles to work them, and the muscles need large bosses and crests of bone on the skull to hold on to. Men are more muscular than women, and so, even in men, though their jaws are very weak compared with the tiger's, the skull is rougher than in women. A woman's skull is lighter and smoother and more rounded than a man's. It is also smaller, and holds a smaller brain. But a woman's brain is quite as big as a man's in proportion to the size of the body it has to look after; that is to say, it is not in any sense inferior to a man's brain.

The only bones of the face that are very important are the jaws, which hold the teeth. We have learned something about them already, and can pass on to the bones of the limbs. We have learned already that the limbs of backboned animals are made on the same principle. To describe the bones of any one of them is to describe almost exactly the bones of any other. Perhaps the collar-bones differ most, but the collar-bone is big in ourselves and in creatures that use their upper or fore limbs in the way we do. We need say no more about it except that it lies very near the surface of the body, as we all know, and is easily broken by a bad fall on the arm or shoulder.

Much more important is the shoulder-blade. The great ridge on the back of it can be felt in anyone. It is a rather flat bone, lying nicely molded on some of the upper ribs. The most important part of it is a rounded socket into which fits the head of the bone of the upper arm. This makes a ball-and-socket joint. The great feature of a ball-and-socket joint is that it can move in any direction. A finger-joint or a knee-joint allows movement in only one or two directions; but the shoulder-joint, and the hip-joint which corresponds to it, are ball-and-socket joints and allow movement in all directions.

The forearm has two bones; they lie side by side when we stretch out the arm with the palm of the hand uppermost. When we turn the hand over, the outer bone crosses over the inner bone. At the elbow both bones are jointed to the bone of the upper arm, and a very wonderful joint that is, though not so wonderful as the knee, which corresponds to it.

Then comes the clever wrist, with its eight pieces of bone all wonderfully jointed. Beyond the wrist we find five long bones; and the first of these has two bones beyond it, making the thumb, while the other four have each three bones beyond them, making the four fingers.



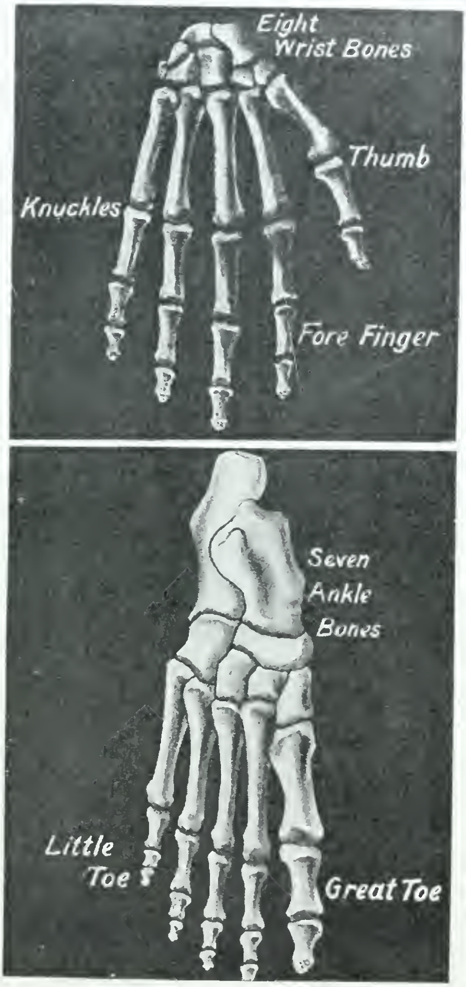
Our legs and arms are made up of many bones, and here we see what these are like, and their different names. The knee-joint is the most wonderful joint in the body, although more easily injured than any other. The bones of the legs and arms are much alike, but the leg has an extra bone—the knee-cap.

Everyone can see that the thumb has one piece of bone less than the other four parts into which the arm is split at its end. But have you noticed that the same is true of your great toe? In some creatures the fingers or toes are webbed, as in the duck, for instance. But have you noticed that our fingers are partly webbed, too? Lay your hand on its back and look at the length of the fingers; then lay it back upward and look at their length again. Then you see that our fingers are a little webbed on the palm side. That makes the palm a little bigger and helps to prevent things from slipping out of it between the fingers. The toes have the same arrangement.

A whole book has been written about the wonders of the human hand. Here we can notice only the greatest of them all—the fact that the thumb can be "opposed" to the fingers, so that it is quite easy to touch the tip of the little finger with the tip of the thumb. The importance of this for the life of mankind is enormous. It means easy grasping, and that means writing and many more things. In all the animals, except in those which are most like us, the thumb is not "opposable" any more than the great toe is in us. The great toe is opposable in some animals, so that they can use feet as well as hands in climbing.

We have already read about the ribs and the breast-bone; so now we pass to the last part of the skeleton—the leg bones. As in the case of the arms there are certain bones that lie between the backbone and the long bones of the arm itself, so in the lower limbs we find bones firmly jointed to form a sort of basin. This is called the "pelvis," which means "basin." It is built round the lower part of the backbone; and you can feel the edge of the pelvis in your side.

On each side of this pelvis, outside it, we find a very deep and strong socket for the head of the hip-bone to fit into. This is many times stronger than the socket the upper arm-bone fits in, because the hip-joint has to do with walking, and its strength must be tremendous. It will stand nearly anything before it will allow itself to be disjointed.



These are the bones of the foot and hand, each with the same number of bones. It is by bringing the thumb opposite to the fingers, which few other creatures can do, that man can make so many wonderful things.

The thigh-bone, corresponding to the upper arm-bone, is the longest, biggest and strongest in the body. At its lower end is the knee-joint, the largest and most wonderful joint in the body, though, unfortunately, not quite perfectly fitted yet for a creature walking upright. Therefore it is very likely to undergo injuries and is also liable to be attacked by disease.

The part of the leg below the knee has two long bones in it, like the forearm. But it is not necessary, or even desirable, that we should be able to turn the lower part of the leg all the way around as we do our arm. So only one of the two bones of the leg is jointed to the thigh-bone. That is the shin-bone. The other, which lies along its outer side, is very slender, and its upper end is simply jointed to the large and strong upper end of the shin-bone. You can feel the head of this outer bone in your own leg lying well below the knee-joint itself.

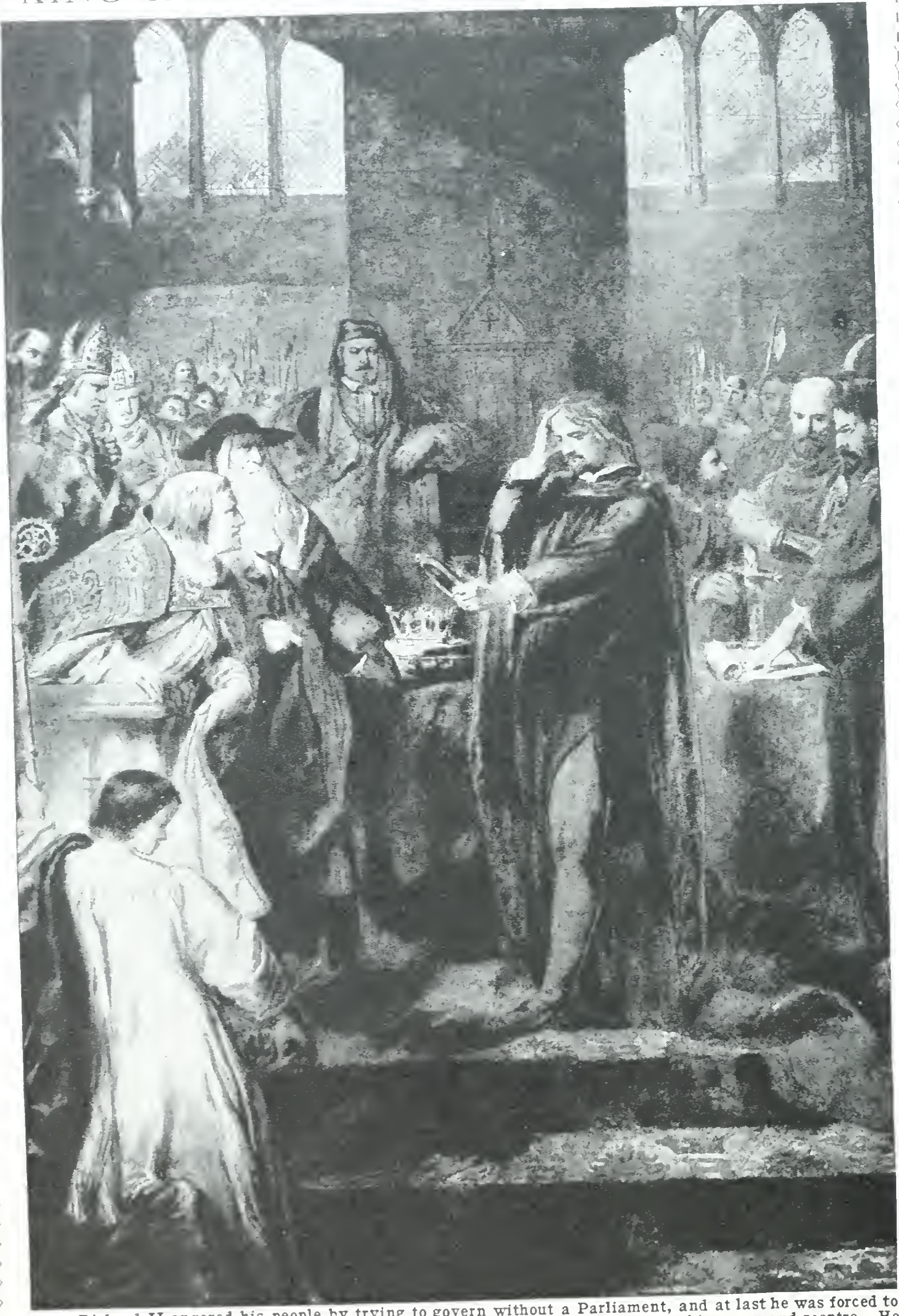
The leg also has an extra bone, the knee-cap; but this is quite peculiar, for there is nothing of the sort over the elbow-joint. The knee-cap is a bone developed inside the strong rope, as we may call it, of the muscles of the thigh, as they pull upon the shin-bone. This rope, as it passes over the knee-joint, has the knee-cap imbedded in it.

The bones of the ankle differ from those of the wrist, as they have such different work to do; and the most notable is the bone of the heel, on which such great strain falls when we stand or walk. But more remarkable than any one bone is the way the ankle-bones form an arch which gives spring and grace to the gait. This arch is beautifully supported by the rope, or sinew, of one of the muscles on the outside of the leg, for this sinew runs right under the ankle and braces it up. Another sinew on the inner side does much the same, and the two together form a sort of stirrup to support the arch of the foot. If the muscles get flabby and weak, the sinews get lax and the foot very often becomes flat. The spring of our gait is lost and we are likely to suffer pain besides.

The bones of the foot exactly correspond to those of the hand. The foot contains the most constantly abused joint in the body—the joint of the great toe. The bones of the foot are so arranged that the inner edge of the foot is meant to be straight, as it always is in a baby; and the great toe should move up and down in a straight line pointing forward. We wear shoes that turn the great toe inward, and compel it to work thus twisted out of shape.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 1803.

KING RICHARD GIVING UP HIS CROWN



King Richard II angered his people by trying to govern without a Parliament, and at last he was forced to resign his crown to Henry Bolingbroke. In this picture we see Richard giving up his crown and sceptre. He then signed a statement that he was no longer worthy to be king. This was laid before Parliament on the next day, and the throne was declared vacant and given to Henry Bolingbroke, who became Henry IV.

ENGLAND FROM EDWARD I TO EDWARD VI

THERE is a famous saying that "uneasy lies the head that wears a crown," and the words are put by Shakespeare into the mouth of Henry VI, one of the kings whose troubled lives come into this story. This chapter tells us of long struggles for the crown of England. We see that the first care of kings has not always been the welfare of the people, and that rulers have not always sought to make nations happy. These pages tell us of the life of England for 200 years, and in this time many important things happened. The people of Wales were conquered, but the people of Scotland refused to be conquered. There were long wars between England and France, in which gunpowder was used for the first time. All this time the lives of the kings were very much troubled, but out of all this turmoil a great and strong nation was gradually being built up.

FIGHTING FOR THE CROWN

WHEN Prince Edward left England and his old father Henry III, to go and fight in the Crusade, his young wife Eleanor pleaded to go with him. It was in vain that he told her how dangerous the journey was, and how uncomfortable she would be on board ship or living in a tent. She only answered that "the way to heaven is as near from Palestine as from England." So the Princess Eleanor had her way; and the story goes that she was able to save her husband's life.

A man sent by the enemy stole into his tent one hot, stifling day when he was resting with his heavy armor off. Before the prince realized what was happening, the man, pretending he had a letter to deliver, struck at him with a poisoned dagger. Eleanor rushed forward and sucked the poison out of the wound, and had the joy of seeing her husband recover, after some days of anxious illness. After this they had to journey home again, for Henry was dead, and the prince was now Edward I.

It was Edward who prepared the splendid double tomb of marble for his father, once sparkling with gold and jewels but now so dusty and gray, close by Edward the Confessor's shrine in Westminster Abbey. He also carried on his father's work by pulling down part of the old Norman Abbey and building it up again in the new style. Edward made many good laws and arranged different courts to deal with the various matters of government. He also took good care that real justice should be done, and sent away judges who were found to be dishonest.

Early in his reign he had bitter fighting with the Welsh. The Britons, as you will remember, had found shelter long before among the beautiful hills in the west from both Romans and Saxons; and their children's children defied all attempts to join their land to England.

The English lords who lived on the borderland had great difficulty in preventing the Welsh from carrying off their cattle and whatever else they could find, and followed them, when they could, back to their hills to punish them. There is a little railway now up to the top of Snowdon, and other lines wind about the valleys, and coaches run from place to place. As one travels about these hills it is easy to understand what fine hiding-places the Welsh had, and how the beauty of the country and the splendid strengthening air made the owners do their best to keep it to themselves.

But Edward was clever and determined, and in the end succeeded in becoming master of the country, so that at last he was able to hang up before the shrine of his namesake, Edward the Confessor, the crown of Llewellyn, the last Welsh prince.

When the nobles came to pay homage to Edward, he promised to give them a prince as ruler, born in Wales, who could neither speak French nor English. He then brought out to them his little son, born at Carnarvon Castle a few days before! Ever since, the king's eldest son has been the Prince of Wales.

HOW EDWARD I TRIED TO UNITE ENGLAND AND SCOTLAND

Edward's great wish was to rule over the whole island of Great Britain, as it had been that of Henry II before him. He wanted the Scottish king to do homage for all his kingdom, but the Scottish king steadily refused.

To try to make the kingdoms one by peaceful means, Edward proposed to marry his son to the Maid of Norway, whose mother was the daughter of the Scotch king. But the little girl, Margaret, the last of her family, died on her way across the stormy North Sea. If she had lived, it might have saved much misery during the years that followed, when Scotland was helped by France to resist England and there was constant war between these countries.

Disputes soon arose as to who should rule in Scotland after little Margaret died, and Edward claimed the right of settling them. Naturally, the Scotch did not agree to this and fought hard to get their own way. During ten years Edward made three campaigns in Scotland. Many of the battles were fought near that narrow part of Scotland between the Forth and Clyde, now so busy with coal-mining and manufactures and so thickly crossed with railway lines. Stirling in the old time was the key of the road to the Highlands, with its fine castle hill, and the Abbey Craig near by, now crowned with a monument to the great Scotch patriot William Wallace, who fought against Edward and gained a victory over the English near by.

THE GOOD QUEEN WHOSE MONUMENT STANDS AT CHARING CROSS

The same year that the Maid of Norway died Edward lost his beloved queen Eleanor. To mark his grief and the honor in which he held her, he built crosses wherever her body rested on its way from Nottinghamshire to Westminster Abbey. Three of these are still to be seen. The site of the last is quite near the Abbey. Green fields and a few country houses were its surroundings then; now it lies in the midst of London, where myriads of hurrying feet pass to and fro by the great railway station at Charing Cross. Edward raised a beautiful tomb for his queen at his father's feet. His own, on the other side of his father's, is a very plain, large one.

A few feet from where he lies is the ancient coronation chair made by him to enclose the famous stone that he brought from Scotland, on which the kings of that country had been crowned for centuries. Edward's chair was painted and decorated with false jewels when new. Now it looks very dull and worn, but it is covered with cloth-of-gold when moved out before the altar for a sovereign of England to be crowned in it. Round the stone run these words, engraved upon it:

If fate go right, where'er this stone is found,
The Scots shall monarchs of that realm be
crowned.

We shall see later how and when these words came true, but it was not until three hundred years after Edward I had laid down his sword.

ROBERT BRUCE, THE HERO-KING OF SCOTLAND, AND THE GREAT FIGHT HE WON

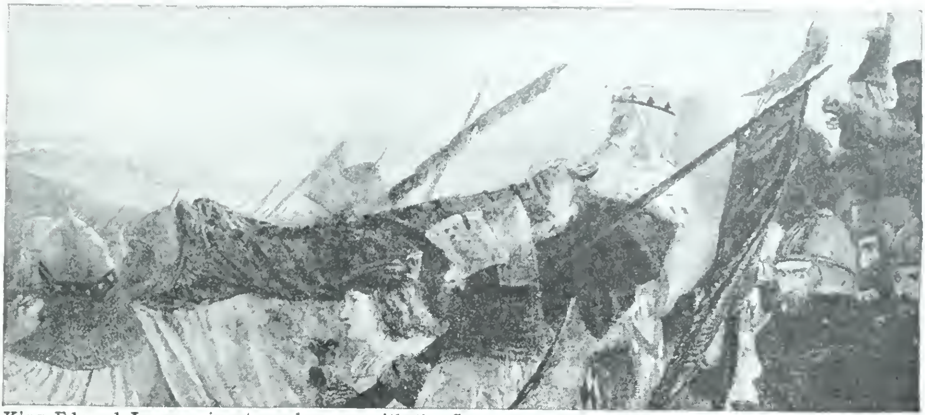
The chief battle in the reign of the son of Edward I was fought at Bannockburn, within sight of Stirling. It was a wonderful day. Robert Bruce, the hero-king of Scotland, rode up and down on his brown pony—a battle-axe in his hand, a gold crown on his head—encouraging his soldiers, whom he had arranged in the best possible way. Robert had not half as many men as Edward, but before night fell the Scotch were free again; and Edward II left so much treasure behind that the Scotch became rich as well as free in this one day.

Edward II ruled so badly that he was made to give up the crown, and his son of fourteen was chosen king in his place. He was Edward III.

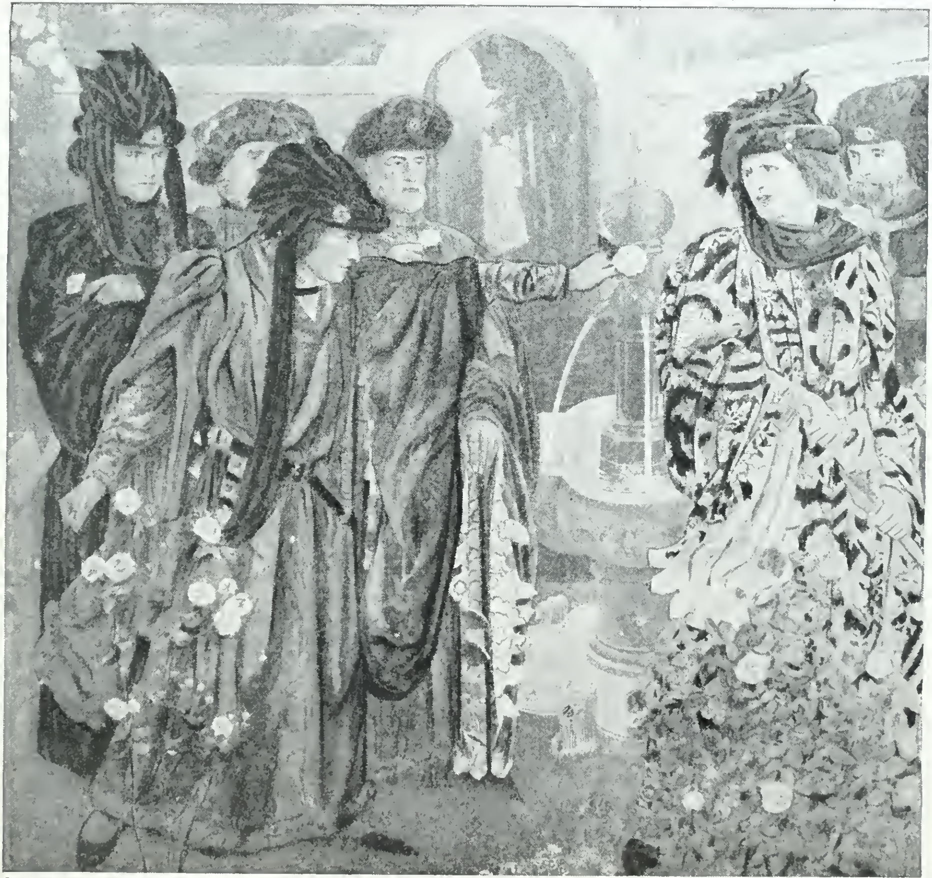
A great deal happened during the fifty years of his reign. He began by marrying Philippa when only fifteen.

The king was away a great deal, for wars with Scotland and France were incessant. He invaded Scotland again and again, and succeeded to a certain extent, till France helped the Scots. Then troubles broke out in

THE BEGINNINGS OF TWO WARS



King Edward I, preparing to make war with the Scots, collected his forces at Carlisle, to lead them northward. But he fell ill, and at Burgh-upon-Sands, resting by the wayside, just within sight of Scotland, he died. His death destroyed the last faint hope of conquering Scotland. He was buried at Westminster under a plain slab on which was inscribed, "Edwardus primus Scottorum malleus hic est. Pactum serva." (Edward I, the hammer of the Scots. Keep troth.) His son, Edward II, was weak.



The Wars of the Roses began in 1455 with the plucking of the roses in Temple Gardens. The king, Henry VI of the House of Lancaster (the red rose), was incapable of government. His kinsmen of the House of York (the white rose) were seeking a share in the government, which was in the hands of favorites. From this beginning the wars became a series of revengeful payments for the deaths of kinsmen. They lasted thirty years. The soldiers, corrupted by the French wars, were very cruel.

that country, as Edward claimed to be the rightful king of France, through his mother. We must remember the names of some of the great battles that followed. The account of them is to be found in a chronicle written by an Oxford doctor, to be seen among the chronicles of England in the British Museum. Every year he wrote down the events as they happened. His name was Adam Murimuth. England's first great sea victory over the French took place at Sluys, and most exciting it must have been. The French king's men found it very hard to tell him what men and ships he had lost.

THE GREAT BATTLE AT CRÉCY, WHERE GUNPOWDER WAS FIRST USED

Later followed the great battle of Crécy in France, fought amidst thunder and lightning and torrents of rain and an eclipse of the sun. It is said that the English had four cannon with them, and that this was the first time gunpowder was used in battle. If so, the loud noise of the firing would add to the terrors of the day. The arrows of the English fell fast and thick as flakes of snow; the men who came to help the French fell back, and soon all was in confusion. Edward's eldest son, barely sixteen, led in the fight, and won the spurs of a knight that day.

You perhaps know the three feathers, with the German motto below, "I serve," used as a crest by the Prince of Wales. It was this "Black Prince," so called from the color of his armor, who took this crest to put on his shield at the battle of Crécy. It had belonged to the brave and blind old king of Bohemia, who cried: "I pray and beseech you to lead me so far into the fight that I may strike one good blow with this sword of mine." He was found dead on the field.

HOW QUEEN PHILIPPA SAVED THE SIX BRAVE MEN OF CALAIS

Then for nearly a year Edward tried to take the town of Calais, whose white cliffs can be seen from Kent. Kent has been called the window from which to look out on Europe; and Calais has been called the door into France. Little wooden houses were built all round the town for the soldiers, and no one could pass food through. At last the people were starving and had to give in to the English.

Edward said that six of the men of Calais must come and give their lives, and then he would let the rest go free. So, one brave man after another offered to go, and the six came to Edward with ropes round their necks. Can you fancy how the wives and children of these men felt as they saw them go to the English camp? Edward would not listen at first when asked to spare them, but shouted: "Call the headsman! They of Calais have made so many of my men die that they must die themselves."

Then Queen Philippa herself knelt before the angry king and, with tears raining down her face, said to him: "Ah, gentle sire, from the day I passed over sea in great danger I have asked you nothing. Now I pray and beseech you, with folded hands, for the love of Christ, to have mercy on them."

The king kept silence for a while, then his heart softened, and he put the ropes of the six citizens into her hands. How happy Philippa must have been as she cared for them, giving them fresh clothes and a feast and presents before they went away!

THE MISERY OF THE PEOPLE AND THE HONOR OF A CAPTIVE KING

But the unhappy war went on. Hundreds and hundreds of soldiers crossed the Channel, to die away from home. Presently it became difficult to find enough men to till the fields, and there was a great deal of poverty and discontent everywhere. A terrible sickness, too, called the Black Death, swept over the country, till nearly half the people died. The rich people did all they could to keep wages low.

The state of France was just as miserable, with land uncultivated and towns in ruins, for people were driven away from their homes, and many of their goods were taken by English soldiers. An old writer said that there was no woman who had not garments, furs, feather beds and utensils from the spoils brought home by the army.

After the next great battle, Poitiers, the Black Prince took the French king prisoner. The story is told that the captive was mounted on a fine white horse, while the prince rode beside him on a pony, and that he stood respectfully behind his chair at table.

The king went home to try to collect

the enormous sum asked for his ransom, and, being unsuccessful, came back, for he was an honorable man, to end his days in England.

Edward, the Black Prince, died before his father. His tomb is to be seen in Canterbury Cathedral, with his black armor hanging over it. One good thing that the king did for England was to encourage the woolen trade. He saw that sheep flourished well, and that there was plenty of water to be had, but that people sent away most of the wool to other countries to be made into cloth. So he invited some clever workers to come over the Channel from Flanders, Philippa's country, to settle in the east of England and gather English people round them to learn to make woolen goods as well as they did. This was the beginning of the great woolen trade in Yorkshire.

CHAUCER, THE GREAT POET, AND WYCLIF, THE GREAT REFORMER

We can gain a most interesting sight of these times from an old writer named Froissart, who lived much at Edward and Philippa's court. The father of English poetry—Chaucer—lived, too, in Edward's reign and that of his successor. You can see his tomb in Poet's Corner in the Abbey. His English is difficult to read because the language has changed so much since those days, but we must read slowly and look up a few words.

Most amusing and delightful pictures of the people does Chaucer draw, and we learn much about the customs of the time from them.

The great reformer Wyclif lived also in this fourteenth century. He has been called the first Protestant because he dared to protest or speak against what he believed to be wrong. He directed the translation of the whole Bible into English.

You can see this "first complete Bible in the English language" among the manuscripts of the Bible in the British Museum, and you will notice that it belonged to Thomas, the youngest son of Edward III. He was the only one of all their children, says Froissart, who was present when Philippa died. Holding the king's hand in hers, she told him her last wishes, asking that "when it should please God to call you hence, you will not choose any other grave than mine, and that you will lie beside me in the Abbey of Westminster." So there they lie, near the Confessor's shrine, Philippa's tomb opposite that of Eleanor, her husband's opposite that of Henry III. It is thought that the faces are portraits.

THE TROUBLED LAND IN WHICH A CHILD WAS KING

Round Edward's tomb were little gilt brass statues of his twelve children, but only six are left. From those of the Black Prince and Lionel Duke of Clarence we can gather the ordinary costume of gentlemen of that day. They wore long outside cloaks, and tight-fitting jackets with belts beneath. It was Lionel who was sent to Ireland to try to bring more of the country under English rule, but he met with very little success. English laws and customs were to be set up round about Dublin, in a district called the English Pale, but beyond that the Irish were to be left to themselves.

The son of the Black Prince, Richard II, followed his grandfather. He was only ten when he came to the throne, and an old poem describing the times quotes the words with sorrow, "Woe to the land when the king is a child."

We have in the same poem a pitiful picture of the idleness of the nobles and clergy, and the sufferings and anger of the poor. The great nobles, especially the king's uncles, were always quarreling, and the peasants who worked on the land could bear their poverty and hardships no longer, but at last broke into open revolt, marching to London, breaking into parks, burning and sacking houses.

RICHARD, THE BOY KING, WHO PLACED HIMSELF AT THE HEAD OF THE MOB

Richard, as a boy of fifteen, showed great courage in meeting this mob of rioters, and placed himself at their head when the leader, Wat Tyler, was struck down. Springing to the front, he cried, "I will be your leader!" But the promises he gave were broken, and the poor folk were none the better off.

Richard did a great deal toward making Ireland more peaceful, but the improvement did not last. He made his own people very angry by trying to govern without Parliament, and at last, after many troubles, he was forced to resign his crown, as Edward II had done before him. It was a sad ending to a brilliant beginning. When he was born his father was a great and powerful soldier and heir to the English throne, and the news of the boy's birth was received with shouts of joy from the soldiers assembled in the Great Hall of the Black Prince at Bordeaux. When Richard died, he had lost all his inheritance and was in prison alone. His tomb in Westminster Abbey is next to his grandfather's.

A distant cousin became king after him—Henry IV. As Henry IV had no real right to the throne, he was constantly in dread of losing it, and found it very difficult to keep order in England and Wales. Scotland was afraid to do much against him, because their Prince James—afterward James I—was a prisoner in England.

When James was about nine years old, his father sent him to France to be educated and to be out of harm's way. His ship fell into the hands of Henry IV, who said: "His father should have sent him to me. I can teach him French as well as the king of France."

PRINCE HAL, WHO STRUCK A JUDGE AND WON A GREAT BATTLE AT AGINCOURT

All the years that the lad spent in England he used for study. He was particularly fond of Chaucer, and later wrote very interesting poetry himself. Henry IV little thought that James, before he returned to his own land and kingdom, would act as chief mourner at the funeral of his own son, Henry V.

Full of life and mischief was Prince Hal, as he was often called in his father's lifetime, and he got into many scrapes, one of which ended, it is said, in his being sent to prison for striking a judge. As soon as he became king, his great ambition showed itself: he wanted to be king of France as well as of England. He had no real right to be so, but gathered a large force and crossed the Channel, and in the face of great difficulties won a victory at Agincourt.

One of the old chronicles tells all about it: "Of the trumpets rending the air with tremendous clamor; of the fury of war and deadly spear-thrusts and eager sword-strokes; of the wedges of archers and their piercing arrows; of how that brilliant star of kings, the light and lamp of knighthood (Henry V), exposed that precious treasure of his person to all the chances of war."

After all this, and more, it was arranged that Henry should marry Katherine, the French princess, and that when the poor, mad old king, her father, died, his son should be passed over, and Henry was to reign with Katherine. Things were in a bad way in France, where there were endless quarrelings among the nobles, and no one to keep them in order, or this arrangement could never have been made.

HOW HENRY DIED AND A BABY KING WAS CROWNED WITH A BRACELET

But all Henry's plans came to a sudden end. He was a good soldier, was wise, and seemed born to do great things; but he died when only thirty-five, leaving a little son of nine months as his heir. There is a picture of his child, crowned and wearing a long mantle embroidered with the arms of England and France. He was crowned on his mother's lap, with her bracelet, it is said, as a crown for his baby head.

Henry died near Paris, a long way from the coast, and the funeral procession went by Rouen at a slow pace in great state, Katherine, a widow at twenty-one, following behind in deep grief.

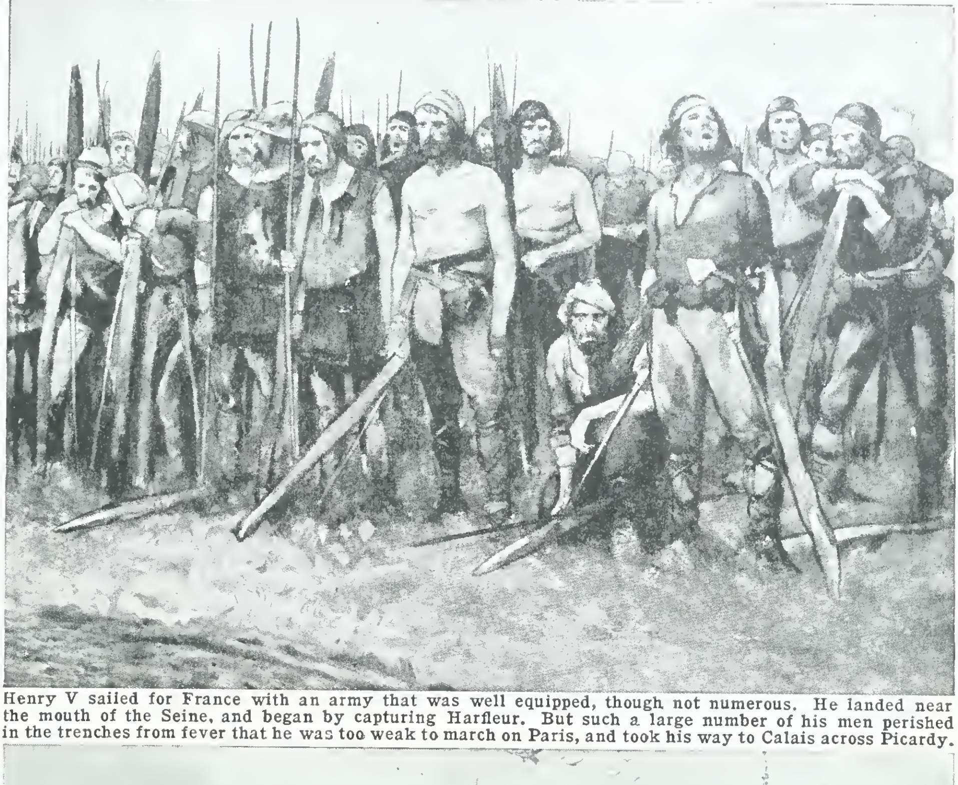
Then, taking ship, the crossing was made, and the procession formed again, passing along in the same order till Westminster Abbey was reached at last. The poet-king, James I of Scotland, followed close to the coffin, and Henry's war-horses walked right up the nave, bearing the armor and helmet of the dead hero.

THE BRAVE GIRL WITH A WHITE BANNER WHO WAS BURNED TO DEATH

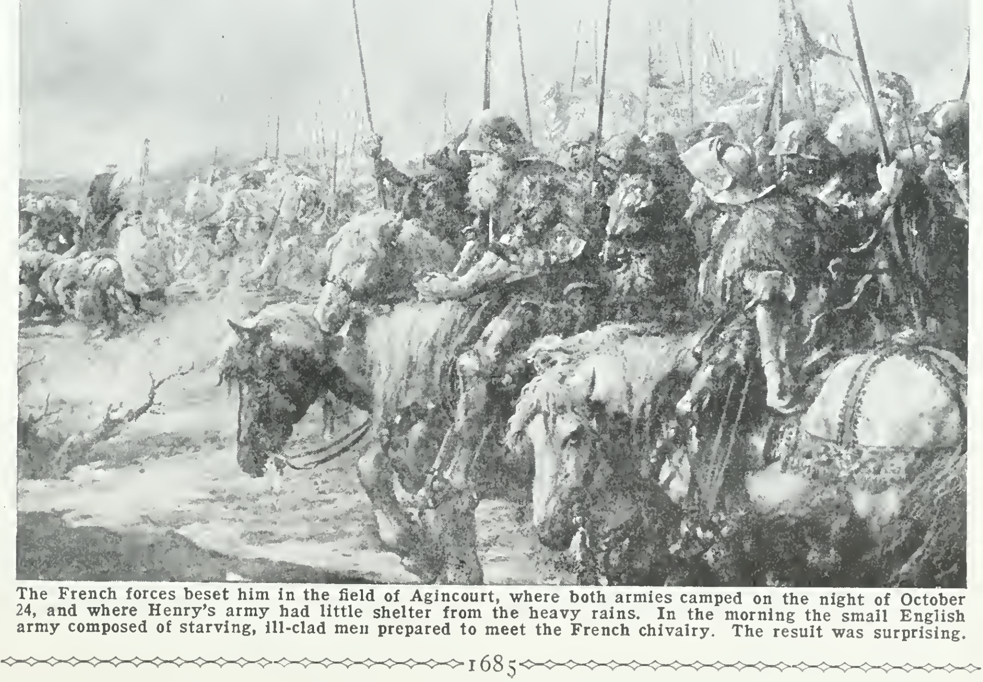
Henry VI had a long reign. First his uncles governed for him, and during this time the English lost what hold they had on France. This was chiefly through the efforts of a young French girl called Joan of Arc, who was bitterly sorry for the miseries of her country, and longed to drive the English out and to see her own king upon his throne. So she dressed herself in shining armor, and rode at the head of an army with a great white banner, cheering on the soldiers and making them brave like herself. At last she succeeded in leading them to victory. She was afterward betrayed into the hands of the English, who cruelly burned her to death.

All the efforts made to regain France were useless, though the struggle lasted many years. One great misery these

THE MEN WHO FOUGHT AT AGINCOURT



Henry V sailed for France with an army that was well equipped, though not numerous. He landed near the mouth of the Seine, and began by capturing Harfleur. But such a large number of his men perished in the trenches from fever that he was too weak to march on Paris, and took his way to Calais across Picardy.



The French forces beset him in the field of Agincourt, where both armies camped on the night of October 24, and where Henry's army had little shelter from the heavy rains. In the morning the small English army composed of starving, ill-clad men prepared to meet the French chivalry. The result was surprising.

wars brought to England was that through them men became trained to be cruel and idle, and to think nothing of taking other people's goods. So, when troubles broke out in England between the nobles, these men were only too ready to join one side or the other, and turn against their own countrymen.

It makes one's heart ache to read of the times of the Wars of the Roses, which now began and lasted for thirty years. The eleven battles which took place during this time were fought between the king and the nobles, up and down the country—near London, on the line of the old Roman wall, in the beautiful dales of Yorkshire; and all brought bitter woe and suffering to the whole country. These wars were called the Wars of the Roses because those on the side of Henry VI and the Family of Lancaster chose a red rose for their badge, and those who were for the House of York chose a white one.

THE END OF THE GREAT WAR FOR THE CROWN OF ENGLAND

In the end, nearly all the great nobles who had begun the war were killed, either in battle or by execution, as first one side and then the other gained the upper hand. At last Henry VI died miserably in the Tower. The poor man was often out of his mind for many years after Edward IV, of the House of York, first became king.

Henry was too weak to control others and to govern in such troubled times, but he was fond of scholars and teachers and books and pictures of all kinds. He founded the great school at Eton and King's College at Cambridge. His wife, Margaret of Anjou, did her best to help him to keep the kingdom, so that their son might have it after him; but the poor lad was killed, and the queen, after being in prison for some time, had to escape from the country and flee to France.

The wife of Edward IV had many sorrows, too. At one time her husband had to leave England in great haste to avoid being taken by the Red Rose party, and she and her daughters had to leave the Tower, where they were living, and go to a safe refuge at Westminster. Here her eldest son, Prince Edward, was born.

CAXTON, THE MAN WHO LEARNED TO MAKE A BOOK IN A FEW DAYS

About that time, close by the west door of the Abbey, there sat a man earning his living, busy from morning till night. He had learned, while young in Flanders, how to reproduce books in an easier and quicker way than the old way of copying by hand; in fact, how to begin and finish a book in a few days. He brought a printing-press back to England, and, setting it up in Westminster, printed many books.

You can see his early efforts in the long King's Library in the British Museum. The thick black letters are hard to read, and it is difficult for us who have more books than we can read to understand the intense interest and pleasure with which Caxton's work was greeted. The king and his family came to watch; the nobles turned over the sheets that poured from his press, to the delight of those who could afford to buy them.

When Edward IV died, his son of thirteen was the next king, but the boy was never crowned, being hurried off to the Tower by his uncle Richard, who soon managed to get his little brother into his power, too. They both disappeared: it is believed that Richard had them killed in the Tower.

HOW THE KING SHOCKED THE PEOPLE AND UNITED THE NOBLES

He now became king himself, as Richard III, and tried to please the people by calling Parliament together and setting many things in order. He also did a good deal for trade and to make it easy for people to produce books. But many were so horrified at the death of the little princes that they turned against Richard, and in the battle of Bosworth Field, which followed, Richard was killed, and Henry Tudor, of the Family of Lancaster, was made king, as Henry VII.

He married the eldest daughter of Edward IV, and so the two Houses of York and Lancaster were united at last, the red and white roses mingling in one double flower, the Tudor rose.

The wiping out of the nobles through the wars had grave consequences. No longer was there any check on the power of the king, and the Tudor sovereigns used theirs more and more as despots.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 1813.

THE STORY OF A BEAUTIFUL THING

OUR general notion of a Last Will is not that it is a beautiful thing. Some of us, perhaps, have never seen a will; and many of us who have, did not possess enough patience to read it to the end, for we found the legal terms long and tedious. A will is often of interest only to the friends and relatives of the man who made it, for it tells them how their friend or relative wanted his property bestowed. The Last Will of Charles Lounsbury concerns us all, for it disposes of the best things that belong to all.

A man does not need to have many possessions to be rich. We are rich by being alive. We may walk penniless in a country lane with all the real wealth of the world; we may be millionaires at the bank and poor in all that is real wealth. Read the will and see how much you want to inherit, for there are great riches to be had. The writer is Mr. Williston Fish, of Chicago, a man of great reputation in law and finance in that city. Charles Lounsbury was a "big, good man" far back in Mr. Fish's family, and so Mr. Fish gave his name to the Will.

THE LAST WILL OF CHARLES LOUNSBURY

The last will of

HE was stronger and cleverer, no doubt, than other men, and in many broad lines of business had grown rich, until his wealth exceeded exaggeration. One morning, in his office, he directed a request to his confidential lawyer to come to him in the afternoon: he intended to have his will drawn. A will is a solemn matter, even with men whose life is given up to business, and who are by habit mindful of the future. After giving this direction he took up no other matter, but sat at his desk alone and in silence.

It was a day when summer was first new. The pale leaves upon the trees were starting forth upon the yet unbending branches. The grass in the parks had a freshness in its green like the freshness of the blue in the sky, and of the yellow of the sun—a freshness to make one wish that life might renew its youth. The clear breezes from the south wantoned about, and then were still, as if loth to go finally away.

Half idly, half thoughtfully, the rich man wrote upon the white paper before him, beginning with capital letters such as he had not made since, as a boy in school, he had taken pride in his skill with the pen:

In the Name of God, Amen.

I, Charles Lounsbury, being of sound and disposing mind and memory (he lingered on the word memory) do now make and publish this my last will and testament, in order, as justly as I may, to distribute my interests in the world among succeeding men and women.

At first, that part of my interests which is known among men and recognized in the sheep-bound volumes of the law as my property, being inconsiderable and of no account, I make no account of in this my will.

My right to live, it being but a life estate, is not at my disposal, but, these things excepted, all else in the world I now proceed to devise and bequeath.

Item: And first, I give to good fathers and mothers, but in trust for their children, all good little words of praise and all quaint pet names, and I charge said parents to use them justly, but generously, as the needs of their children shall require.

Item: I leave to children exclusively, but only for the life of their childhood, all and every, the dandelions of the fields and the daisies thereof, with the right to play among them freely, according to the custom of children, warning them at the same time against the thistles. And I devise to children the yellow shores of creeks and the golden sands beneath the waters thereof, with the dragon-flies that skim the surface of said waters, and the odors of the willows that dip into said waters, and the white clouds that float high over the giant trees.

And I leave to children the long, long days to be merry in, in a thousand ways, and the Night, and the Moon, and the train of the Milky Way to wonder at, but subject, nevertheless, to the rights hereinafter given to lovers; and I give to each child the right to choose a star that shall be his, and I direct that the child's father shall tell him the name of the said star in order that the child shall always remember the name of that star after he has learned and forgotten astronomy.

I devise to boys jointly all the useful idle fields and commons where ball may be played, and all snow-clad hills where one may coast, and all streams and ponds where one may skate, to have and to hold the same for the period of their boyhood. And all meadows, with the clover-blooms and butterflies thereof; and all woods, with their appurtenances of squirrels, and whirring birds, and echoes, and strange noises; and all distant places which may be visited, together with the adventures there found, I do give to said boys to be theirs. And I give to said boys each his own place at the fireside at night, with all pictures that may be seen in the burning wood or coal, to enjoy without let or hindrance, and without any incumbrance of cares.

Item: To lovers I devise their imaginary world, with whatever they may need, as the stars of the sky, the red, red roses by the wall, the snow of the hawthorn, the sweet strains of music, or aught else they may desire to figure to each other the lastingness and beauty of their love.

Item: To young men jointly, being joined in a brave, mad crowd, I devise and bequeath all boisterous, inspiring sports of rivalry. I give to them the disdain of weakness and undaunted confidence in their own strength. Though they are rude and rough, I leave to them alone the power of making lasting friendships, and of possessing companions, and to them I give all merry songs and brave choruses to sing, with smooth voices to troll them forth.

Item: And to those who are no longer children, or youths, or lovers, I leave Memory, and I leave to them the volumes of the poems of Burns and Shakespeare, and of other poets, if there are others, to the end that they may live the old days over again freely and fully, without tithe or diminution; and to those who are no longer children, or youths, or lovers, I leave, too, the knowledge of what a rare, rare world it is.

THE MUSIC OF THE WILLING HEART

A POOR old fiddler was trudging late one night through a forest when a little man in a red cap met him.

"I want you to come and play at a wedding dance," he said.

"I'm sorry, sir," said the fiddler; "but I am old and rheumatic, and cannot play as I used to play when I was young. My fiddle is old too, and alas, it is broken, so that I can only make such a screeching noise that people are glad to give me a penny to stop playing and go away."

"Never mind," said the little man. "If you will only play with a willing heart, you'll play well enough!"

He took the old fiddler to a lighted cave in the depth of the wood, and then led him down an underground passage, which opened out into a splendid hall. Hundreds of pretty little fairies came dancing with delight round the poor old fiddler, crying: "Do play us a waltz! We have never heard a waltz! Do play for us!"

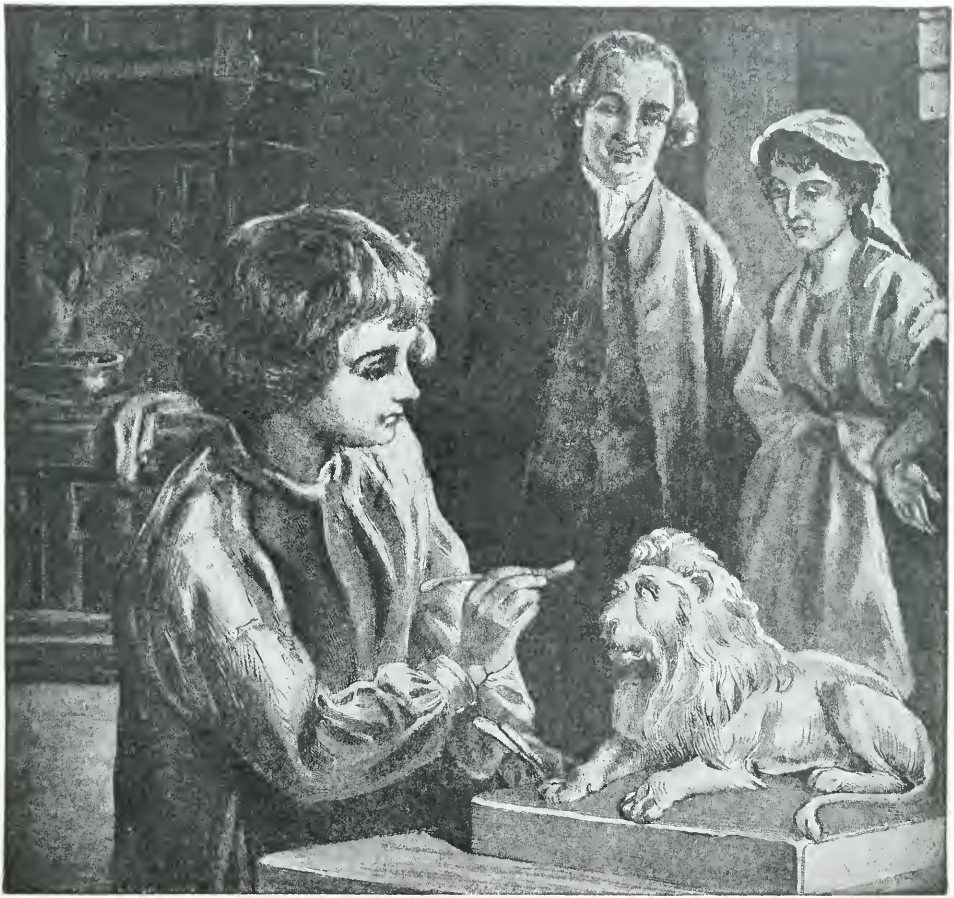
Remembering that it was only a willing heart that they wanted, the old beggar put his old fiddle under his chin and began to play. To his surprise, his arm and fingers became as strong and supple as a young man's, and his broken fiddle gave out a tone of wonderful beauty. Rocking himself to and fro with joy at the fine music which he was making, he played for hours and hours without feeling the least fatigue; and when he had played every tune that he could remember one of the fairies said: "Willing heart shall have a willing hand. Henceforward you shall always play as well as you played to-night!"

When the old fiddler woke up next morning, he found that he had become an excellent violinist, and that he had grown about forty years younger.

ANTONIO'S WONDERFUL LION

ON a summer day in the year 1787 a small peasant lad was flying along the white, dusty road which led from Venice to the little village of Possagno. In both hands he clasped a big lump of clay, which old Pietro, the potter, had given him.

As the boy, whose name was Antonio, came into the village street, several of his playfellows shouted to him to join their games, but Antonio only fled the faster to his own home.



FROM THAT SHAPELESS MASS OF BUTTER A LORDLY LION HAD ARISEN

"Just see, mother!" he cried, holding up his clay. "See what old Pietro has given me! What fine castles and birds and flowers I shall be able to make now!"

Sinking down on the floor, the ten-year-old sculptor set to work, never looking at his dinner.

He was too intent on molding the clay to notice even the arrival of a generally welcome visitor.

The visitor was his mother's cousin, a very grand person in his own and the villagers' eyes. For he was head cook at the castle, where the senator Giovanni Falieri, the lord of Possagno, lived in great state. As a rule, Tommaso always brought delightful scraps of broken meat or rich pastry, but to-day he was empty-handed, for he was much too worried to think of anyone but himself. He sat down on one of the rude chairs, and leaning his chin on one hand, gazed moodily around.

"What's the matter, cousin?" asked Antonio's mother.

"Matter enough, I can tell you," was the tart reply. "Just think, the master is giving a large banquet to-morrow night, and has ordered me to invent some decoration for the table that has never been seen before."

"But you're so clever that you're sure to think of something," said his cousin, hoping to cheer him. The fat cook was usually a kind and jovial man, and she hated to see him in despair.

"I can't!" said Tommaso irritably. "That's just my misery, and the time is running so short! The master is tired of my castles and dragons in pastry, and of my sugar birds and trees and flowers; even a lifelike chariot that I carved out of a turnip, with rings of carrots for golden wheels, doesn't please him now, nor yet the upright clock made in sweetmeats. No; nor the almond-paste crown set with its jewels of candied gooseberries and cherries. Oh, what can I do?"

And the wretched man could do nothing but wring his hands in despair; he had no new ideas at all.

"Go on thinking, and you'll get an idea at last," urged Antonio's mother, while Antonio himself was much too busy with his modeling to look or even to speak.

"Go on thinking!" cried Tommaso. "Well, if that's all the help you can give me, I'll be off." And he moved toward the door, brushing past Antonio so roughly that he jerked a beautiful little swan, which the boy had just modeled, out of his hand. Without looking round, he walked gloomily away with his head hanging down.

"Oh, my poor swan; you've quite spoiled it!" cried Antonio sorrowfully. For the swan had struck against the wall and fallen on the floor in a shapeless heap.

"Oh, how I detest you!" added the boy angrily, shaking his fist at Tommaso's back.

"Poor man! He's dreadfully worried to-day," said his mother. "You ought to be sorry that you can't help him, for think how often he brings you cakes and tarts."

"So he does!" said Antonio. And from that moment he was lost in deep thought.

Next morning, at sunrise, he was knocking at the kitchen door of the castle.

"Cousin Tommaso," he said, "I've thought of something that I will make for your master's table, something that no one else has ever seen before. Only give me a big block of butter, and a little room where I can be all by myself, and where no one can watch me at my work."

"All right," said the cook. "Of course, you'll only waste the butter; still, you may try."

For more than twelve hours Antonio toiled at the task he had undertaken, Tommaso calling through the door occasionally for news of his wonderful work. Antonio paid no heed to his jeers; but just as the sun began to sink, and the hour for the banquet drew near, he flung open the door and displayed his handiwork.

From that shapeless lump of butter a lordly lion had arisen, standing very nearly two feet high! Every detail, from the finely molded muzzle right down to the tip of his tail, was in faultless proportion.

If Tommaso was struck dumb with admiration and surprise, still more so were the host and guests when this masterpiece appeared on the table as its crowning ornament. The lordly lion and the senator's clever cook in consequence were the chief topics discussed at the banquet.

Filled with admiration for his cook's performance, the senator sent for him and loaded him with praise. To the astonishment of all, however, Tommaso burst into tears.

"Alas!" he wept. "Not I, but another molded that lion."

"Then fetch him here at once," commanded the senator.

Thereupon, to the further bewilderment of that gay company, Tommaso presently reappeared, pushing a very frightened, ragged little peasant boy in front of him. He was too much frightened to lift up his eyes, or even to heed what was said about his lion, but from that moment Antonio's fortune was made. The senator apprenticed him to Torretto, the greatest sculptor of the day, and under his care Antonio made such rapid progress that after two years the twelve-year-old sculptor presented his patron with two beautiful baskets in marble filled with exquisitely molded fruits. These same baskets may even now be seen in the Falieri Palace in Venice. For the little barefoot lad developed into the famous Antonio Canova, one of the greatest of the sculptors that the modern world has produced.

THE MAN OF GREAT IMPORTANCE

MANY years ago some soldiers were engaged in the repair of some fortifications. Directing the operations was a pompous little officer who gave his commands in a very loud voice.

The men were trying to get a beam of timber to the top of a mound, but they were not strong enough. One more pair of arms and the work would have been easy.

Yet the officer did not offer to help in any way. He simply stood and shouted his commands, mixing these with abuse of the soldiers for their failure in the task.

"Now, you fellows," he shouted, "put your backs into it! Heave ho! Don't stand looking at it—move it!"

A gentleman dressed as a civilian, who happened to be walking by, stopped and watched the proceedings, and then asked the officer why he did not help.

"Are you aware who I am, sir?" asked the officer, with indignation and astonishment. "I am a corporal."

"You are not, though, are you?" said the other. "I was not aware of that, and I am sure I beg your pardon."

Then the new-comer threw off his coat, and going to the little group of perspiring men, lent a hand, so that the timber was soon in position. The officer did not even thank the gentleman for his help, but as the civilian put on his coat again he said quietly: "The next time you have a task of this kind in hand, sir, and have not enough men, just send to me, and I will come and help."

"May I ask who you are?" inquired the corporal haughtily.

"Yes, sir," replied the gentleman. "You will always find me by addressing a letter or sending a messenger to the headquarters tent. My name is George Washington, and I am commander-in-chief of the army. Good day, sir!"

The civilian walked away, and the pompous corporal stood still, too deeply chagrined for speech.

PEASANT GIRL AND EMPRESS

THE INNKEEPER'S DAUGHTER WHO SLEEPS IN ROME

UNDER a great dome in the Vatican at Rome are two splendid tombs. One contains the body of the daughter of Constantine; the other is the tomb of St. Helena, the mother of Constantine.

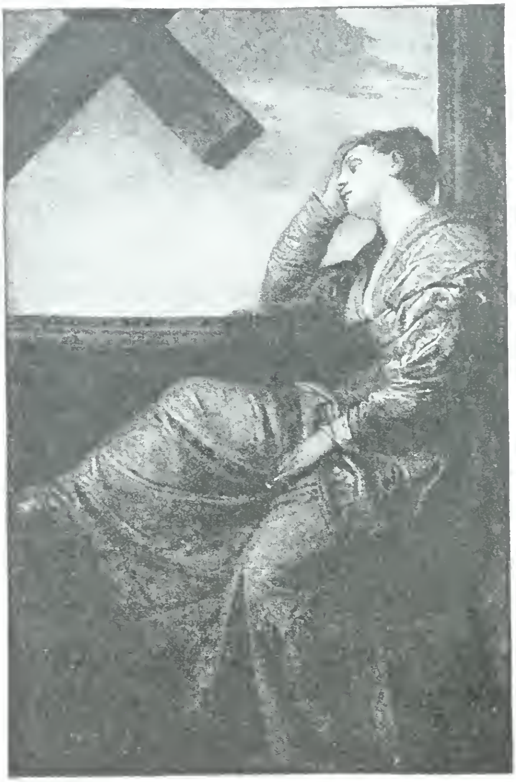
Helena was born quite a poor girl. Her father was a humble innkeeper, and she helped him at the inn, and looked after the cows and goats. The actual place of her birth has for centuries been a subject of dispute. Many authorities believe that she was born in England, but the truth seems to be that her birthplace was a tiny village in Bithynia, an ancient division of Asia Minor. There it was that, in the bloom of her youth and beauty, she was discovered by a great officer of the Roman Empire named Constantius Chlorus. The innkeeper's daughter won the heart of the Roman officer, and he married her.

The great noble and his peasant wife lived very happily together, and in the year 274 she gave birth to a son who was destined to become the famous Roman emperor Constantine the Great. Until now the husband of Helena, though distinguished in the state, was only a governor. In the year 292, however, a terrible sorrow came upon her. The great Roman Empire was divided into four parts, and her husband, Constantius Chlorus, was made the ruler of Gaul, Spain and Britain. But he had to choose between the wife he loved and the great position now offered to him. The emperor Maximian, who offered the crown, offered also his daughter Theodora in marriage. A Roman emperor must have a wife of noble birth, and so, to gain the crown, Constantius divorced poor Helena, and married Theodora.

Constantine was twenty when this happened. He must have been terribly grieved at this slight cast upon the mother he so passionately loved, for he did not accompany his father when he took up his new dignity. He remained with his mother, and later went away as a soldier on his own account, so that he became a famous warrior without any assistance from his father.

At last Constantius could bear the separation no longer, and wrote to Constantine begging him to go to him. Constantine went, making a journey full of terrible dangers to meet his father at Boulogne. Together they went to England, and his father died at York in 306, respected and beloved by all in the land.

But this St. Helena, as we now call her, was all this time a pagan. Christians were terribly persecuted in Rome at this time, and she had probably never thought of becoming a Christian. Her conversion was the result of a strange thing which Constantine himself seems to have believed. Before he could bring order and peace to the Roman Empire he had many great battles to fight, and in one of these battles Constantine saw, or believed that he saw, a flaming cross in the sky, and the words displayed across the heavens: "By this conquer." He regarded this as a sign from heaven, and became a Christian. He made Christianity the religion of the great Roman Empire, of which he was now master, and the Roman legions in time all carried the cross as their standard.



The vision of St. Helena.

It was the conversion of her son that brought about the conversion of Helena. She came forth from the retirement in which she had lived for so long, and devoted her life to Christian acts. When nearly eighty years old she set out on a pilgrimage to the Holy Land, and discovered what was believed to be the Holy Sepulchre and the Cross. She is said to have had the Cross divided into two parts, one of which she left with the Bishop of Jerusalem and the other she sent to her son.

Helena remained in Palestine for some time, and built churches at Bethlehem and on the Mount of Olives. She visited many of the churches of the East, giving liberally to each and bestowing much alms upon the poor wherever she went.

At last she returned from her long travels, and died in her son's arms, in 328, in the eightieth year of her age. Constantine had the body of his mother carried in state to Rome, and buried with the highest honors.

The poor peasant girl of other days had come from poverty and obscurity into high place as the wife of one of the great men of the empire; then she relapsed into obscurity as complete as that in which her girlhood had been passed. But through the affection and respect of her illustrious son she was made the first lady in the empire and the leading figure in the Christian Church. And at her death she lay amid the greatest figures of that nation which had ruled all the known world.

After her death Helena was canonized by the Church—that is to say, the Church found that she had lived so pure and godly a life that she was to be regarded as a saint. That is why we now call her St. Helena.

It is from her that many English churches take their name. There are many churches bearing her name round about York, where it is held that Constantine was born. Thus we find, among others, churches named after St. Helena at Escrick, Stillingfleet, Wheldrake, Thorganby and Skipwith.

One strange little irony remains to be noted. Before the Reformation there was in York itself an old church built on the city wall. In that church lay the body of Constantius Chlorus, father of Constantine the Great and husband of St. Helena. But no one ever thought of him. It was of the good peasant woman that they thought. They called the church St. Helena's, and never gave a thought to the dead emperor sleeping in the casket within the church bearing the name of the poor woman.

GELERT, THE FAITHFUL DOG

KING JOHN of England had not much affection to spare for anyone. But there were two beings he really loved—his beautiful daughter Joan, and his splendid greyhound Gelert. And when Joan married Llewelyn, the Prince of Wales, he gave them Gelert as a wedding gift. Prince Llewelyn was a great hunter, and he, too, soon became much attached to the noble hound.

The first day he took Gelert out with him the greyhound chased a stag from Carnarvon to a rock—which is now called Beth Gelert—where the stag fell dead from exhaustion.

Gelert was always the first hound to appear when Prince Llewelyn blew his hunting-horn at the castle gate. But one morning the greyhound did not answer the call. Putting the horn to his lips, the prince again blew long and loudly, and then called, "Gelert, Gelert!" But the hound did not come, and being unable to wait any longer, his master rode off to the hunt.

That day, however, he had little sport, for Gelert was not there. Tired, disappointed and angry, he returned to his castle, and as he entered the gate the dog came bounding out with his mouth dripping with blood. There was a strange look in the eyes of the hound, which told the prince that something dreadful had occurred.

"Has he gone mad and killed somebody?" he exclaimed.

A terrible suspicion flashed across his mind. Princess Joan had a little son a year old, and when Gelert was not out hunting he was always to be found by the child's side. Prince Llewelyn rushed toward the room where his baby had been sleeping, and the hound followed him. A trail of blood led to the room. The prince drew his sword as he entered, and then recoiled in terror. There was a pool of blood on the floor, an empty, overturned cradle, and no sign anywhere of the child. Crouching down by the cradle, with a look of entreaty, Gelert began to whine.

Blind with rage, Prince Llewelyn turned upon him with uplifted sword, and thrust it through his heart, crying: "Monster, you have devoured my son!"

Giving a wild yell, the greyhound expired with his eyes fixed on his master's face. His dying yell was answered by a cry from beneath the cradle, and there Llewelyn found his little son unharmed, with its sleepy head resting on the body of a dead wolf. Now that it was too late, Llewelyn saw why Gelert had not come that morning when he sounded his horn. The wise and faithful hound had smelled out the wolf, and had fought and killed the fierce beast.

The prince was now broken-hearted. "Although I cannot bring you to life, Gelert," said he, sadly, "I can keep alive the memory of your noble deed."

He buried the faithful dog by the rock where the stag that Gelert had chased from Carnarvon had fallen, and for hundreds of years people passing by the grave threw on it a stone, and the cairn they made is still called Beth Gelert, or the Grave of Gelert.

LE MALIN FERMIER ET LE NAIN

THE ENGLISH VERSION OF THIS STORY IS GIVEN ON PAGE 4558.

UN fermier qui possédait une petite colline sur ses terres, ayant décidé qu'elle ne devait pas servir à rien, se mit à la labourer. Aussitôt un nain qui l'habitait en sortit et, furieux, demanda au fermier de quel droit il osait déranger son repos en labourant le toit de sa demeure. Le fermier s'excusa humblement, mais remarqua qu'il serait dans l'intérêt de tous deux que la colline fût labourée et qu'on y récolta une moisson.

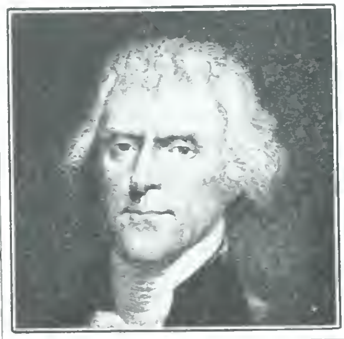
Le nain refusa d'abord, mais le fermier fit de son mieux pour le convaincre. Il proposa de tout faire lui-même à la condition que le nain consentît à ce que, la première année, tout ce qui pousserait au-dessus du sol fût au fermier, et tout ce qui serait dessous au nain; et la seconde année, ce qui serait au-dessous, au fermier, et au-dessus, au nain.

Le nain consentit à cet arrangement; mais le malin fermier planta du blé la première année et abandonna les racines au nain, et la seconde année, il planta des carottes, qu'il récolta en laissant au nain le feuillage inutile.

THE NEXT STORIES ARE ON PAGE 1841.

SOME BUILDERS OF THE NEW NATION

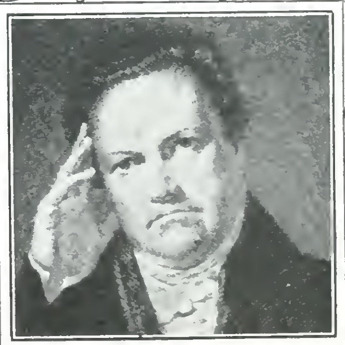
HAMILTON


JEFFERSON

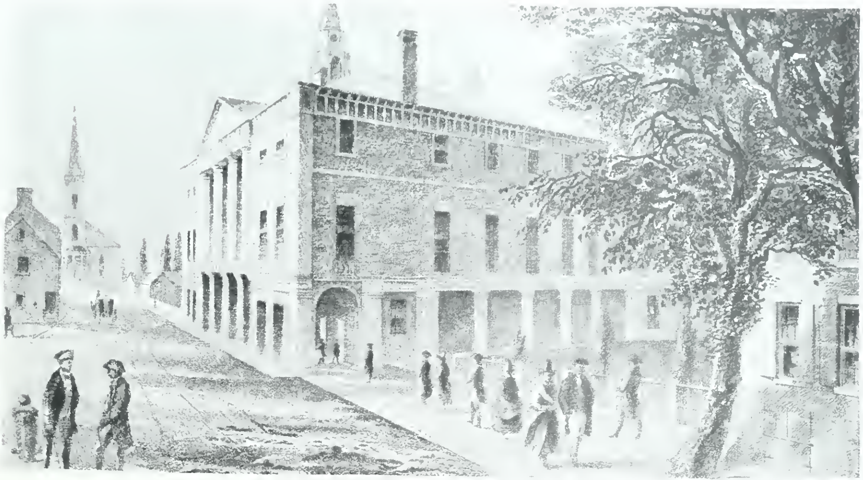
MADISON

ADAMS

PINCKNEY

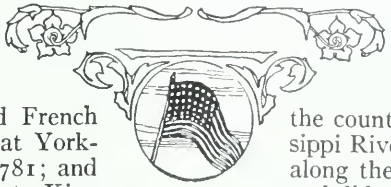

CLINTON

These are not all who had a share, but they were all important. The firmness of John Adams gained a favorable treaty of peace from England, while Hamilton's skill in money affairs put the nation on its feet. We have said much about Jefferson. Charles Cotesworth Pinckney was prominent in his day. Madison was our fourth president. DeWitt Clinton built the Erie Canal, of which we shall hear more.



The old City Hall, Wall Street, New York, called Federal Hall.

BUILDING THE NEW NATION



WE have already read that Cornwallis surrendered his whole army to the combined French and American armies at Yorktown on October 19, 1781; and that everybody except King George III felt that the colonies must have their independence. He was stubborn, however, and peace was delayed. He even declared, after he had been shown that the British could not conquer the colonies if they were helped by the French, that at least the state of Georgia and the cities of New York and Charleston, which were held by British troops, must be kept. General Wayne soon drove the British army out of Georgia, the Spaniards took Florida, and the obstinate king was forced to agree that peace should be made.

SPAIN AND FRANCE WISH THE UNITED STATES KEPT SMALL

This peace was not made at once, for the interests of Spain and France had to be considered. One of the reasons why France had helped the colonies was the hope of harming England, and the French government did not care to see the new American nation become too powerful. Spain controlled all the country west of the Mississippi River, and that to the east along the Gulf of Mexico also, and did not wish Americans too near. So the chief minister suggested that all the country between the Mississippi and the Ohio rivers—now Ohio, Indiana, Illinois and the states north of them—should remain an English possession. The country south of the Ohio and east of the Mississippi—now the states of Kentucky, Tennessee, Alabama and Mississippi—should be Indian territory, a part under the protection of the United States and a part under Spain. This plan would have given the thirteen states no room to grow.

The Americans who had been sent over to make peace would not agree to such a plan, and at last, November 30, 1782, a treaty was agreed upon, though it was not signed until September 3, 1783. This treaty gave to the United States all territory held by England east of the Mississippi River, and gave the privilege of catching fish on the coast of Newfoundland. On the other hand, the United States agreed that all debts due British merchants must be paid and that Congress would recommend to the states that they should not pass harsh laws against those Tories who had not been active against the American cause. On the whole, the Americans had gained a great deal—more than they had hoped to get.

THE TORIES ARE HARSHLY TREATED AFTER THE WAR

The states did not pay much attention to these recommendations, and many Tories left their homes when the British troops sailed away. Many others were forced to go later, and some historians say that about 100,000 in all left the colonies. Some of them went to England, some to the West Indies, but more to Canada, where they had a hard time at first. Some of these were bad men who had done much harm to their neighbors. Others had honestly believed that Parliament was in the right and during the Revolution had gone about their business and had troubled nobody. The colonies needed population so badly that it seems a great pity that the good as well as the bad Tories were forced to leave.

WASHINGTON RESIGNS AND RETURNS TO HIS HOME

As soon as it was certain that peace had been made, the army which had been in camp near Newburgh, New York, was disbanded, November 3, 1783. On December 4, Washington met his officers in Fraunces' Tavern, which is now owned by the City of New York and is kept as it was then. After bidding an affectionate farewell to his officers, he was rowed across the Hudson to New Jersey, as we see in the picture on another page. When he reached Philadelphia, he handed to the proper officer a statement of the money he had spent out of his own pocket after he took command of the army in Cambridge more than eight years before. The amount was $64,315. For his services during that time he refused to accept any pay. When he reached Annapolis, Maryland, where Congress was then sitting, he resigned as commander of the army and hurried away to spend Christmas at Mount Vernon. He had seen his home but once during the whole eight and a half years, and was anxious once more to devote his time to his family, his slaves and his lands. We shall see, however, that he was not long allowed to remain at his beautiful home, which he loved so much.

Now that the colonies had become independent states, what sort of government did they have? You remember that in the beginning of the Revolution, delegates from the states met and called themselves the Continental Congress. This body raised an army, issued paper money, borrowed money and conducted the war, but no one could say how many or how few its rights were. Soon men began to feel the need of some sort of union, and a committee drew up a paper called the Articles of Confederation. Congress adopted them in November, 1777, and sent them to the states to be adopted or rejected. The states were very slow, and not until March, 1781—when the Revolution was almost over—did all the states agree to accept the Articles.

WHAT WERE THE ARTICLES OF CONFEDERATION?

In order to understand our government now, we must understand what sort of government we had under the Articles of Confederation. The states kept nearly all the power and the Confederation had little. Now, we all know that the United States is above any one state, but it was not so then. There was no president. Each state sent not less than two and not more than seven delegates to Congress, and each state, whether large or small, had one vote.

These delegates were officers of the state, not of the United States. They were paid by the state, and might be called back home at any time. No state had a vote unless at least two delegates were present. If a state had two, four or six delegates present and half were on one side and half on the other, the state lost its vote. No law could be made unless nine states voted in favor of it, and so very few laws were made. No change could be made in the Articles unless every state agreed, and all never did agree.

Congress was given the right to establish a government, make treaties, establish post offices, raise an army and build a navy, but was given no power to raise money to pay for them. It could only recommend that each state pay its part of whatever money was needed. The states were jealous of one another and very often refused to pay what was asked, saying that the amount was more than their share, and Congress could not make them pay. They had fought the Revolution because of taxation, and had grown to hate taxes of any sort. Now a government which has not the power to raise money is almost the same as no government at all.

After peace was made, conditions grew worse. During the war the danger made the states agree sometimes. When the war was ended, they quarreled all the time. The army was not paid, and some of the officers wished to make Washington king. The Congress could not even get money enough to pay the interest on the money borrowed from Europe during the Revolution. In Massachusetts there was a little war known as Shays' Rebellion, and in other states men refused to obey the state laws.

MORE CURIOUS IDEAS ABOUT TRADE

Now, every state and every city is glad to get as much trade as possible. Then, the old ideas of trade about which you have been told elsewhere were believed. The people in New York thought that because people from Connecticut and New Jersey sold wood and food in New York City they were enemies who carried off the money from the city. So they laid heavy taxes on everything coming from those states, and those states in revenge refused to trade with New York at all. Other states quarreled about other matters and threatened to fight. Then, too, the territory west of the Alleghany Mountains was claimed by several states and they quarreled about that.

Truly the United States was "one nation to-day and thirteen to-morrow." The wisest men began to despair. There was danger that civil war would break out, and then one by one the states might be brought under the power of England or of Spain, for the latter nation was hoping to join Georgia and South Carolina to Florida, and had also refused to allow American boats to float down the Mississippi into the Gulf of Mexico. Spain hoped that the people in what is now Kentucky and Tennessee would join her in order to get the right to use the Mississippi.

It was seen that something must be done quickly. Some men who had met to talk about changes in the laws published a plan for a convention to change the Articles of Confederation, and early in 1787 Congress decided that a convention should be held. The convention met in May, 1787, in Philadelphia, in the same room where the Declaration of Independence had been signed. Many great men were members, and Washington was chosen to preside over the meetings. Some of the other members were Benjamin Franklin, James Madison and Alexander Hamilton. They had met to patch up the old confederation, but at once they began to talk about a new form of government in which the people instead of the states should rule.

THE ATTEMPT TO FORM A STRONGER GOVERNMENT

At once the delegates were divided into a small-state and a large-state party. Virginia then had the largest population, and she felt it unfair that her population and size should give her no more voice than Delaware, Rhode Island or New Hampshire. The small states feared that the large states would oppress them and said that the old plan of one vote for every state must be continued. Finally it was agreed that Congress should be made up of two branches. In the one, called the Senate, each state, whether large or small, should have two members. In the other, called the House of Representatives, the states were to have members according to their population.

Then the delegates disputed about the powers that Congress should have. Some did not want a strong central government; others wished a monarchy or something very like it. One man said that the old state lines ought to be wiped out and thirteen new states of equal size ought to be made. The farming states wanted one thing, the shipbuilding states another. The slaveholding states had one idea, the states where there were few or no slaves had another. They disputed about the head of the government also, and it seemed that they could not agree. Some wished a president to hold office for life, others wished the office to be held by a committee of seven. In another place we shall tell you more about the Constitution.

THE CONSTITUTION IS FINALLY ADOPTED

At last, after four months of discussion, the Constitution was adopted and sent by Congress to the states to be voted on. The Convention had decided that the new government would begin when nine states had agreed to accept the plan. The others were to be left out if they refused to join the majority. It is said that Franklin, when the Convention broke up, pointed to a picture of the sun in the hall and said, "As I have been sitting here all these weeks, I have often wondered whether yonder sun is rising or setting. But now I know that it is a rising sun."

When the Constitution was sent to the states, many prominent men tried to get the different states to vote against it. Patrick Henry and Samuel Adams, who had done so much to bring on the Revolution, worked against it because they were afraid that it took too much power away from the states. Samuel Adams at last agreed not to oppose the new plan, but many other patriots held out in opposition. They feared that the president would become a tyrant.

Many others did not like some things about the new plan, but they felt that if they did not take it, there would be no government at all. These men and the friends of the new form of government were too strong for the opponents. Delaware first approved and was followed by Pennsylvania, New Jersey, Georgia, Connecticut, Massachusetts, Maryland, South Carolina, New Hampshire, Virginia and then by New York. North Carolina and Rhode Island did not join the new union until the government was well begun.

A PRESIDENT OF THE UNITED STATES IS ELECTED

When the time came to elect a president, there was only one choice for the head of the new nation. Ten states voted. North Carolina and Rhode Island were not members of the Union, and New York did not get ready in time. Washington was again called from Mount Vernon to serve his country. He was supposed to begin his administration on the first Wednesday in March, 1789, but not until April 30, 1789, was everything ready. On that day he took the oath of office on the balcony of Federal Hall in New York City. The building was long ago torn down, but, almost on the exact spot, on Wall Street to-day, you may see a bronze statue of the "Father of his Country," and in the City Hall is much of the furniture used by the first officers of our government. John Adams of Massachusetts was chosen vice-president.

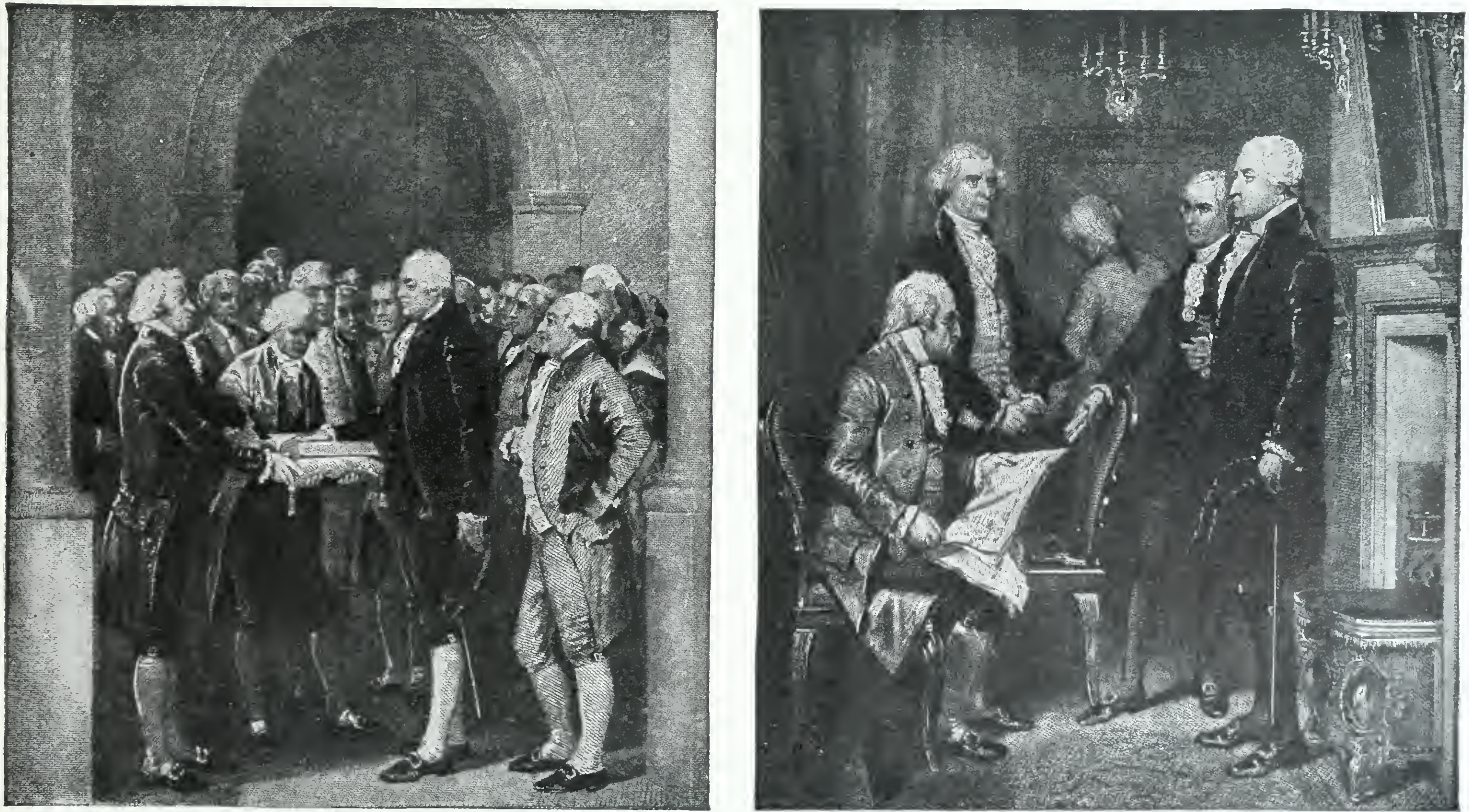
We are proud of the size, the wealth and the population of our country to-day, but it was a very poor and weak nation then. The population was about four millions of people—not so many as now live in the single city of New York. Not more than 100,000 lived west of the Alleghany Mountains, where the fierce wild animals and the Indians hid in the woods to attack the scattered pioneers. Most of the people got their living by farming or fishing, though cotton-manufacturing was just beginning, and a few iron-foundries existed. There were only a few small cities. Molasses brought from the West Indies was made into rum, and on every farm was a spinning-wheel and a loom. Small ships were built in New England from which to fish or with which to trade with the West Indies. For the most part, the young nation depended upon Europe for its manufactures.

THE UNITED STATES IN WASHINGTON'S TIME

Railroads, telegraphs, telephones, gas, electric lights and matches were unknown. People traveled from place to place on horseback, in carriages, by boats or by stages. These last-named took a week to go from Boston to New York, if they did not stick in the mud. We can now travel the distance in five hours, and can go from New York to Berlin more quickly than Washington could go from Mount Vernon to New York. Candles were generally used for lighting at this time and even much later. Fire was usually made by striking a flint stone with a piece of steel. Often if the fire went out during the night a child was sent to a neighbor's house to bring back some burning embers in a pot. Coal was hardly used at all.

Only four or five towns deserved the name of city at all. Boston and New York were unpaved, unlighted towns, in the streets of which the cattle and pigs moved at will. Philadelphia was the largest town, and was noted for its paved sidewalks and its fine houses. Charleston was an important port, and ships from England came for the rice and indigo, bringing with them manufactured goods of every kind. Baltimore was smaller, but was prosperous, and had one fine street, of which the people were proud.

THE BEGINNING OF THE GOVERNMENT OF THE NEW NATION



On April 30, 1789, George Washington was inaugurated President of the United States at Federal Hall, on Wall Street, New York City. The Subtreasury, with its fine statue of the first president, now occupies the spot. The second picture shows his first advisers. Henry Knox, Secretary of War, is seated; next stands Thomas Jefferson, Secretary of State, and to Washington's right is Alexander Hamilton, Secretary of the Treasury. The Attorney General was not a member of the Cabinet at first. The Cabinet has been increased, until now there are ten of these advisers. You will find the list of them where we tell about our government.

The life of the farmer and of the farmer's wife was hard. There was no machinery to save labor, such as we now see on almost every farm. Everything was done by hand. Often the father tanned the hides of the cattle and made the family shoes from the leather. He was often forced to be a carpenter, a butcher and a blacksmith, as well as a farmer. The farmer's wife took care of the house, spun yarn, wove cloth and made the clothes for the family, knit stockings, made soap and candles, looked after the milk and butter, cured the meat, made sausages and did hundreds of other things, helped by her daughters. The sons helped the father on the farm.

There were few newspapers, and we should think them very poor. They were small, badly printed and had few readers. Books were scarce and high in price. Even lawyers and doctors had very few. Mails were slow and seldom arrived in time. Often a letter took weeks to make a trip now made in hours. The people in one state knew little of those in another, and sometimes people in different parts of the same state were entire strangers. We know now more about what happens in Japan or India than the Georgian knew about what happened in Connecticut.

SOME FINE HOUSES IN THE COUNTRY

Very little attention was given to music, literature, art or architecture, though there were some fine private houses filled with furniture, silver and china brought from Europe. The houses were heated by great fireplaces, and had none of our modern conveniences, such as running water, bathtubs, gas or cooking stoves.

Many of our common vegetables, such as the tomato, the cauliflower and the egg plant, were unknown. Apples and pears were small and not very good, while the only strawberries or raspberries were those which grew wild. Ice was kept only by the wealthy, who built private ice-houses. Our modern way of preserving the flavor of fruits and vegetables by putting them into tin or glass was not used then, but they were dried in the sun.

Such was the country over which Washington was chosen president. His work was not easy. A government had to be organized and officers appointed. The Congress had borrowed much money which it could not pay, and no one would trust the new government. Money had to be found to pay these debts and to pay the officers of the government. The people did not believe in keeping an army in time of peace, but all knew that we must have a small force to keep the Indians in order. A navy was also necessary, but armies and navies cannot be kept without money.

HOW MONEY WAS FOUND TO RUN THE GOVERNMENT

Washington chose as Secretary of the Treasury—as the officer in charge of the money affairs of our government is called—the young Alexander Hamilton about whom you have read. This young man knew his business and got Congress to lay a small tax on goods from abroad. The colonists had opposed such taxes when laid by Great Britain but now they made no objection, and soon the treasury had money enough.

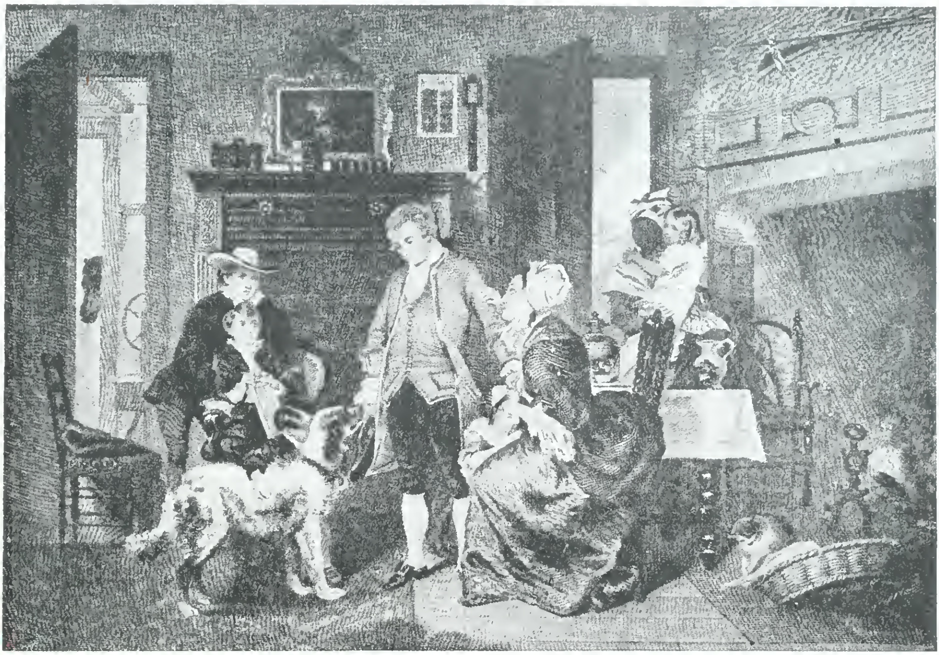
Such a tax is called a tariff or an import duty. It is called an indirect tax because people pay it without knowing it. The merchant who brought in the foreign goods paid the tax first. Then he added the tax and his profit to the price of the goods. The people who bought the goods could not know how much of the price they paid was the cost of the manufacture, how much was cost of bringing from abroad, how much was tax and how much was profit, and so they did not object.

If Hamilton had persuaded Congress to tax every house, every farm and all other property, that would have been a direct tax, because it was collected directly from the owner of the property. Some of the states might have forbidden their citizens to pay such a tax, and the Union might have been broken up. He did cause a small direct tax to be placed on whisky, and some people in Pennsylvania refused to pay it. But Washington called out a large body of troops and the people gave in and agreed to pay the tax.

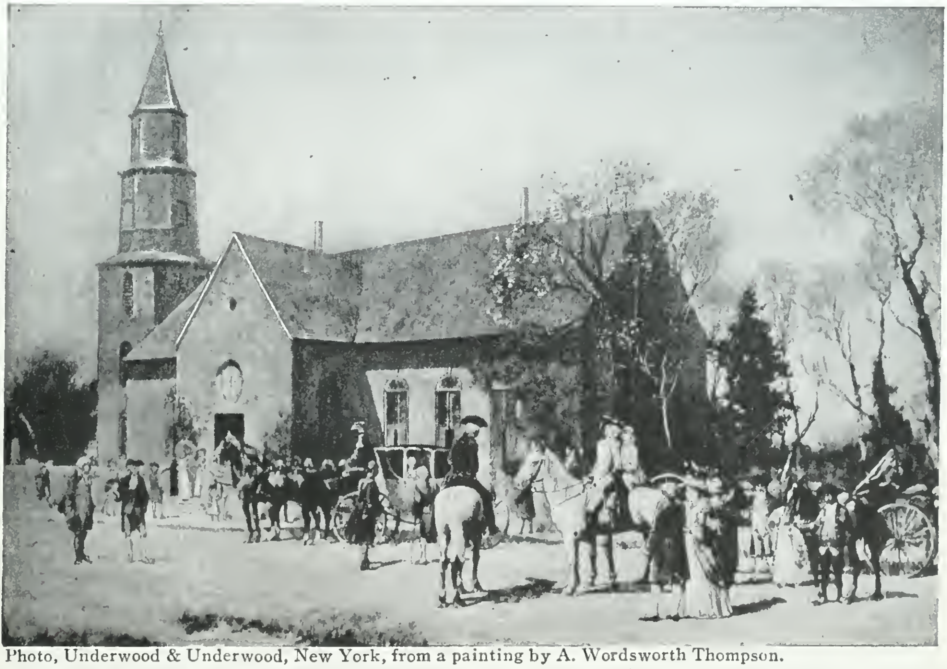
WE HAVE TROUBLE WITH ENGLAND AND FRANCE

In another part of our book you may read of the French Revolution, which began in 1789. Many of our citizens sympathized with France. They said that the French had helped us in the Revolution, that they had established a republic like ours, and because of this fact they were at war with England. England was our enemy too, for she still kept soldiers in some forts on American soil, and her

WHEN THE COUNTRY WAS YOUNG



Here is the interior of one of the homes of which we speak in the text. There were many houses in Virginia equal in every respect to this. Notice the solidly built furniture and the general air of comfort. Towns were few, newspapers were few, and in the country districts company was so much valued that a servant was often sent to the taverns to request strangers to come to spend the night.



Photo, Underwood & Underwood, New York, from a painting by A. Wordsworth Thompson.

This picture of Sunday at Old Bruton Church at Williamsburg, Virginia, shows the dress and manner of the times of which our article treats. Notice the powdered hair, the cocked hats and ceremonious manners of the gentlemen. Williamsburg was once the capital of Virginia, and George Washington, Thomas Jefferson, Patrick Henry, Richard Henry Lee and many other famous men attended service here.

warships stopped American vessels to look for English sailors. For these reasons they said that we ought to help France, even if it brought another war with England.

Washington knew that we were not yet strong enough to fight England again, and, besides, he felt that in France the Revolution was going too far. So he declared, in 1793, that the United States would remain neutral, which meant that we would take neither side. We made no friends by this plan, for France was very angry because we did not join her, and England captured our ships if they were sailing to the other country. It took all of Washington's strength to keep Congress from declaring war against England, but he succeeded. He knew that we were growing stronger every year, but that if we fought with England again, we could get no help from Europe and we would be almost sure to lose our independence. Instead, he sent John Jay to England to make a treaty. He succeeded, though it was not very favorable to the United States. Many people did not like the treaty.

POLITICAL PARTIES BEGIN IN THE UNITED STATES

During Washington's first term there had been no political parties in the country, but during his second, which began in 1793, the people began to divide. One party, led by Hamilton and John Adams, wished a very strong central government. They did not believe in the rule of the people but thought that only the wealthy and the well-educated should have a voice. Thomas Jefferson said that the best government was that which governed least, and that all the people were more likely to be right than a few, no matter how rich and well-educated they were. The followers of Hamilton were called Federalists and those of Jefferson were first called Republicans, but later were called Democrats.

Washington tried hard to keep the peace between these parties, but found it hard work. He was beginning to grow old and wished very much to go back to Mount Vernon. When his second term was almost over, he declared that he would not serve a third term, though a great majority of the people wished him to continue in office. At the election the vote between Adams and Jefferson was very close, but Adams was chosen.

"MILLIONS FOR DEFENSE BUT NOT ONE CENT FOR TRIBUTE"

Adams was not popular in France, and that country did not like his election. Then, too, the French were angry because we had not helped them and because we had made a treaty with England instead of fighting. So they began to capture our ships, and when we objected, our representatives in France were told privately that if we would bribe some French ministers, our vessels would not be captured. When this base offer became known in this country it was reported that Charles C. Pinckney, one of our representatives, had said, "Millions for defense, but not one cent for tribute." The people were much excited, an army was raised, Washington was made commander and some warships were built which captured some French vessels. War was not regularly declared, but when France found that the United States would fight, she became quite willing to make peace.

The remainder of Adams' administration was full of trouble. Some foolish laws had been made. One gave the president power to send any foreigner out of the country without a trial or else to put him in prison. Another punished anyone who opposed the government or who published anything which was thought to make people think less of the officers. These laws, called the Alien and Sedition Laws, were so unpopular that Adams was not given a second term, but Jefferson was elected in his stead.

THE PURCHASE OF LOUISIANA DOUBLES OUR COUNTRY'S SIZE

The most important event during the eight years Jefferson was president was the purchase of Louisiana. You were told on page 784 how France gave to Spain in 1762 all the territory she claimed west of the Mississippi River. In 1801 Spain gave it back to France, as Napoleon had a dream of founding a new French nation in the New World. He had great trouble in the West Indies, however, and soon saw that the English fleet could destroy any colony he might plant, and, besides, he needed the money for his wars. So he sold the whole territory, which was greater in size than the United States at that time, for $15,000,000. This was called the Louisiana Purchase. From it thirteen states, or parts of states, have been made. Some of them, as Iowa and

Missouri, are now among the richest and most prosperous states of the Union.

There were only about 40,000 people in this great territory, and many prominent men thought that it would be hundreds of years before it would have many settlers. Many said that the money of the old states would be wasted in buying the territory. Some men advised the New England states to secede, that is, to leave the Union, if the territory was taken by the United States. Only nine years later (1812) a small part of the territory was admitted to the Union as the state of Louisiana, and in 1821 another part became the state of Missouri. A hundred years after the purchase, the population of the whole territory was more than 15,000,000, and the value of the crops raised and the goods manufactured every year was more than two hundred times as much as the whole price paid.

WE GAIN A CLAIM TO LAND ON THE PACIFIC COAST

Little was then known of the Pacific coast. In 1792 Captain Robert Gray had sailed into a great river, which he called Columbia after his ship, and the country around was generally called Oregon, but very little was known about it. Jefferson determined to send William Clark and Meriwether Lewis to explore. Before they started, Louisiana was bought.

The expedition left St. Louis in 1804, went 1,600 miles up the Missouri River before winter set in, and the next spring went on until the river grew so small that a man could step across it. They then crossed the Rocky Mountains and found another river, which they followed to its mouth where Captain Gray had entered. No white man had ever made this trip before them, and their exploration helped the United States to claim Oregon when the dispute arose with Great Britain many years afterward.

FRANCE AND ENGLAND BOTH PREY UPON US

During the years of Jefferson's administration England was trying to crush Napoleon, who had conquered most of Europe. England declared all seaports in Napoleon's power to be blockaded, that is, closed against vessels from any other nation, and Napoleon answered by declaring all British ports blockaded. The United States had many merchant ships which traded with Europe, and both France and England began to capture them if they were sailing toward the ports of the other nation, just as they had done during Adams' administration. In 1807, 194 of our vessels were captured by England, and many by the French. Besides, England stopped our ships to look for sailors who had deserted, and sometimes took men who had become citizens of the United States, or even men born in this country. This was called "impressment." The European countries did not then agree that a man could change his nation.

Jefferson tried hard to avoid war, for he felt that we were not yet strong enough to fight, and tried to punish both countries by getting Congress to pass laws forbidding our ships to trade with either country. While these laws hurt France and England, they hurt our own country more, and caused Jefferson to lose some of his popularity, but a majority of the people wanted him to serve a third term. He followed Washington's example and refused, and it has grown to be the custom to elect no president to serve more than two terms of four years each.

A FORMER VICE-PRESIDENT IS THROWN INTO PRISON

During Jefferson's administration the country increased rapidly in population and wealth. In 1807 Robert Fulton, of whom you may read in another place, ran his steamboat, the Clermont, on the Hudson River, and soon such boats were on all our rivers. A sad event was the death of Alexander Hamilton, who was killed in a duel in 1804 by Aaron Burr, then the vice-president. Later Burr had a plan to set up a monarchy in the West, or in Mexico, but the plan failed, and the man who had been the second highest officer in our government was thrown into the common jail in Richmond while awaiting trial.

WHY VIRGINIA IS CALLED THE "MOTHER OF PRESIDENTS"

Our next president was James Madison, also a Virginian. In fact, during the first thirty-six years of our government Virginia furnished the presidents for thirty-two, and so came to be called the "Mother of the Presidents." Madison was one of the ablest and one of the best men that have ever been president, but he came into office at a hard time. Both England and France were capturing our ships, and the Indians west of the Alleghanies were murdering the settlers who were moving westward in large numbers.

Though Madison loved peace as much as Washington or Jefferson, the idea of war had become popular. Some wished to fight England, some would have fought France, and a few wished to fight both. But England had captured more of our ships than France had done, and the Western people hoped to capture Canada and add it to the Union. They could not see the difficulties in the way, and in 1812 war was declared. In the Constitution we declared that a foreigner could become an American citizen after a term of years. England said, "Once an Englishman, always an Englishman." She claimed, therefore, that a man born in England was a British subject, though he might have lived in the United States twenty years and be a citizen, or even an office-holder.

Four reasons for declaring war were given: (1) England had stirred up the Indians in the West. (2) She had captured 900 of our merchant ships in ten years. (3) She had blockaded our coasts. (4) She stopped our ships and impressed, that is, took off by force, our seamen, pretending that they were British deserters.

We then had about 8,000,000 people; England had 20,000.000. We had a few ships with 4,000 sailors and 1,500 marines; England had hundreds of ships and 150,000 sailors. Two hundred and thirty of her ships were larger than any of ours. Our army was small, while England had many trained soldiers. Most of them, however, were occupied against Napoleon at this time. Worse than all our other weaknesses was the fact that New England did not want to fight. The profits of shipbuilding and trading were so great that New Englanders felt that they could better afford to have some ships captured than to go into a war and have all of their trade cut off.

THE AMERICAN SHIPS AND SAILORS ASTONISH THE BRITISH

Two attempts to invade Canada failed, and the British captured Detroit because the American officers were cowardly or were poor commanders. But on the sea the result was different. The American frigate Essex captured the Alert. Another American frigate, the Constitution, began, a few days later, her wonderful career by making a wreck of the British Guerrière in half an hour. The Guerrière was not quite so large a ship as the Constitution, but the fire of the latter was the most accurate that had ever been seen. A few months later the Wasp took the Frolic, and the frigate United States took the Macedonian. This British ship lost a hundred and six men and the American lost twelve. Two months later the Constitution took the Java, and early in 1813 the Hornet took the Peacock.

England was stunned. During almost continual war with France for twenty years she lost only five vessels and had taken hundreds. Here in six months she had lost six and had taken none. Was it possible that she was no longer "Mistress of the Seas"?

THE TIDE TURNS. "DON'T GIVE UP THE SHIP"

But during 1813 the tide turned. The British frigate Shannon, under Captain Broke, offered battle to the American frigate Chesapeake. Though the Chesapeake had a new and untrained crew, Captain Lawrence had come to despise British skill, and sailed out to meet the Shannon, which had a good crew. In a few moments the Chesapeake was disabled and her commander was wounded, but as he was carried below he cried, "Don't give up the ship!" Some of the sailors refused to fight and the ship was given up, though Captain Broke of the Shannon was wounded.

"WE HAVE MET THE ENEMY AND THEY ARE OURS"

On land things went against us at first this year, and it began to seem as if we were to lose territory instead of capturing Canada, but in May, York (now called Toronto) was captured and the government building was burned. Then this same year a wonderful victory occurred. Lieutenant Oliver H. Perry built a small fleet on Lake Erie in a few weeks, and on September 10, 1813, met a British fleet. The fighting was fierce, and on Perry's own little ship all the crew except eight were killed or disabled. They made their way in an open boat to another of his ships, carrying their flag with them, and continued to fight. In a little while he was able to send the report, "We have met the enemy and they are ours." This victory enabled General William Henry Harrison to defeat the British and Indians and to recapture Detroit.

The next year another attempt was

made to invade Canada under Generals Jacob Brown and Winfield Scott. We shall hear much more of the second name in the next story of our land. Two very bloody battles were fought at Chippewa and at Lundy's Lane, within sound of Niagara Falls, but though the Americans claimed the victory, soon they had to retreat. The British tried to send a fleet and army by way of Lake Champlain by much the same road which Burgoyne, of whom you read on page 1168 had taken, but at Plattsburg both fleet and army were driven back.

WHY THE CANADIANS FOUGHT SO WELL

Those who had thought that the Canadians would be glad to join the United States were wrong. On the contrary, they fought as well as the British soldiers. There was a reason for this. Many of the Canadian soldiers were the children of Tories, or Loyalists, who had been forced to leave the United States. Their families had lost much property and had suffered many hardships. They felt that they had been unjustly treated and were burning with the desire to do harm to the country which had driven them out. Therefore, until near the end of the war the Canadian forces were generally victorious, in spite of the fact that they were very few.

Another reason was the difference in leaders. In the early days of the war the American forces were led by officers who had been appointed because they were popular, or else by men who had served in the Revolution and were now too old for active service. The Canadian leader, in the beginning, was Sir Isaac Brock, a young man of great talent. His death at Queenston was a great blow to the Canadians. Some of the other British or Canadian leaders were not very good, and the Americans put better generals in command toward the end of the war. It was found that the fact that a man was popular was no proof that he would be a good general.

One of these men, who afterward won great fame, now comes into notice. The Creek Indians in Alabama, who had risen against the Americans, were crushed, March 27, 1814, by a force under Andrew Jackson, about whom you may read on page 1916, and also in several other places, and never made much trouble afterward.

WASHINGTON CAPTURED AND BURNED BY THE BRITISH

Just about this time Napoleon was defeated and driven from France, and England sent more soldiers to the United States. One force under General Ross found that Washington was not well defended, marched on the city and captured it without trouble. In return for the burning of Toronto, the Capitol and the White House were burned, but were later rebuilt. Next they attempted to capture Baltimore, but were driven back. While a British fleet was bombarding the fort in the harbor Francis Scott Key wrote our national song, The Star-Spangled Banner. The words tell the story of the battle.

All this time the Americans continued to be successful on the sea. Most of the warships were blockaded in the harbors, but many privateers roamed the seas destroying British commerce. A privateer was a ship owned by a private individual, which was given permission to capture merchant vessels of the nation with which the country of the privateer was at war. Many of our shipowners put a few small cannon on board, and instead of carrying goods sailed about looking for the enemy's trading vessels. An English paper said, "If they fight they are sure to conquer, if they fly they are sure to escape."

WHY THE NEW ENGLAND STATES OPPOSED THE WAR

The New England states continued to oppose the war because it interfered with their profits. They would not allow their soldiers to fight outside their own state, and hindered the government in every way. In December, 1814, a number of their leaders met in Hartford and advocated dissolving the Union. You will notice that during the first twenty-five years of our government, New England was threatening to leave the Union a great deal of the time.

That section was not interested in manufactures. Much money had been invested in building ships, and the shipowners wished to trade with other nations. Then, too, New England was jealous of the West. Thousands of the best citizens had gone to the new western states. Ohio and other new states were growing rapidly in population, while some of the older states were growing very slowly. Moreover, the people of New England were, for the most part, Federalists, and disliked Jefferson, Madison and other Republican leaders.

The convention which met at Hartford did not determine to leave the Union at once, but did adopt some resolutions which would make it difficult to admit new states. They also demanded that the Constitution be changed in several other particulars. A committee was sent to Washington to lay the resolutions before Congress, but something happened just then which put a stop to their plans. Since the British had not succeeded in taking Baltimore, they determined to attack in another place.

BACKWOODSMEN DEFEAT WELLINGTON'S VETERANS

Next the British, on January 8, 1815, made an attack on New Orleans. Andrew Jackson, who defended the city, had thrown up rude breastworks. Many of his men were Tennessee and Kentucky backwoodsmen who could hit a squirrel in the top of the highest tree. The British commander, Sir Edward Pakenham, was a brother-in-law of the Duke of Wellington, and his force was made up of veteran soldiers who had done wonderful work in Spain. Pakenham was like Braddock in looking down on the American troops, and instead of marching around them, which he could easily have done, determined to capture the breastworks. The British fought bravely, but the wonderful marksmanship of the Americans was too much for them, and within less than half an hour the British retreated, leaving 2,600 dead or wounded before the rude defenses. Among the killed was their commander, but the American loss was only eight killed and thirteen wounded. This was the most brilliant land victory of the war.

It is sad to think that this terrible sacrifice of life was unnecessary. On Christmas eve, two weeks before, a treaty of peace had been signed by the English and the American commissioners. But there was then no ocean telegraph, and no steamship had as yet crossed the ocean. Not until many days after the battle was the news received in this country.

THE TREATY OF PEACE SIGNED AT GHENT

The treaty of peace was a very strange paper. The chief reason we had gone to war was because England had stopped our vessels to search for forbidden goods, or captured them if they were bound for France. Then, too, English captains had taken off sailors, claiming them to be British subjects. Not a word was said about these matters in the treaty, but England did not stop any more of our ships. The truth is that both sides were anxious for peace. England wished it because the entire map of Europe had to be made over on account of the fall of Napoleon, and she thought she might need all her troops in Europe. We wished it because our government seemed about to break down.

The war had been a great strain on the government, and, except for what our navy did, we cannot be very proud of it. Congress was afraid to levy taxes high enough to get money, and many of our generals proved themselves poor leaders. The sections were so jealous of one another and of the Union that we did not do our best. But there was a bright side.

WHAT THE WAR DID FOR THE NATION

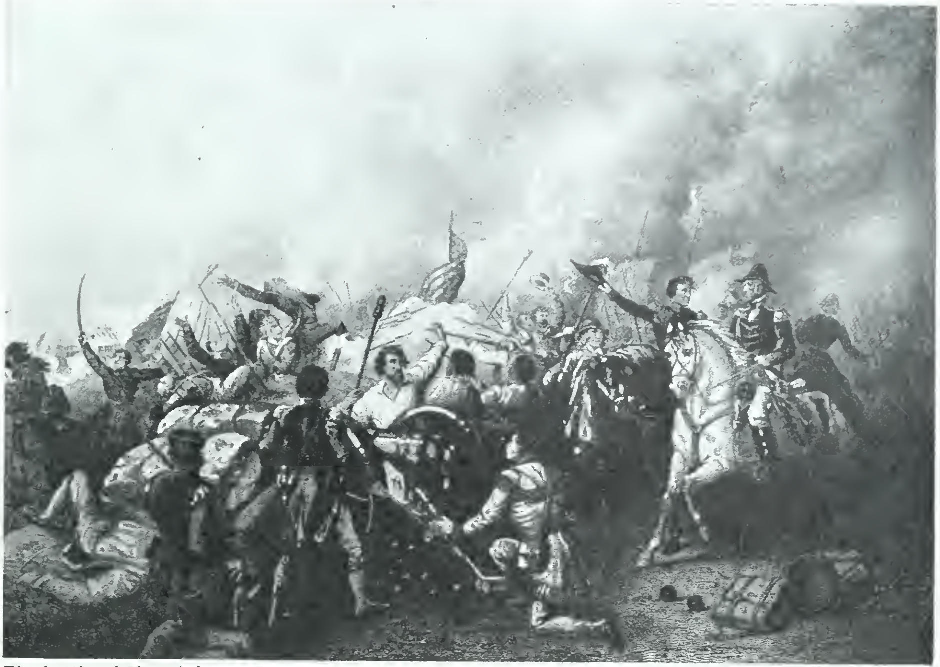
This war marks the end of the time of weakness for the new nation. It was again proved that, if the American had been properly trained and was properly led, he was at least a match for the best soldiers of Europe. On the sea American ships and sailors acknowledged no equals. Of thirteen naval battles we were successful in eleven. We had beat England on the sea, and no other nation had ever done this before.

Then, too, a feeling of pride in the United States had been brought out. We forgot the defeats of the war and remembered only the victories. Americans grew to have more confidence in themselves. In the beginning of the nation men were proud of their states and jealous of the nation. As new states were made, the people felt that the Union was more important, for the Union had made the state. At the end of the war there were eighteen states, and six more were admitted in less than ten years.

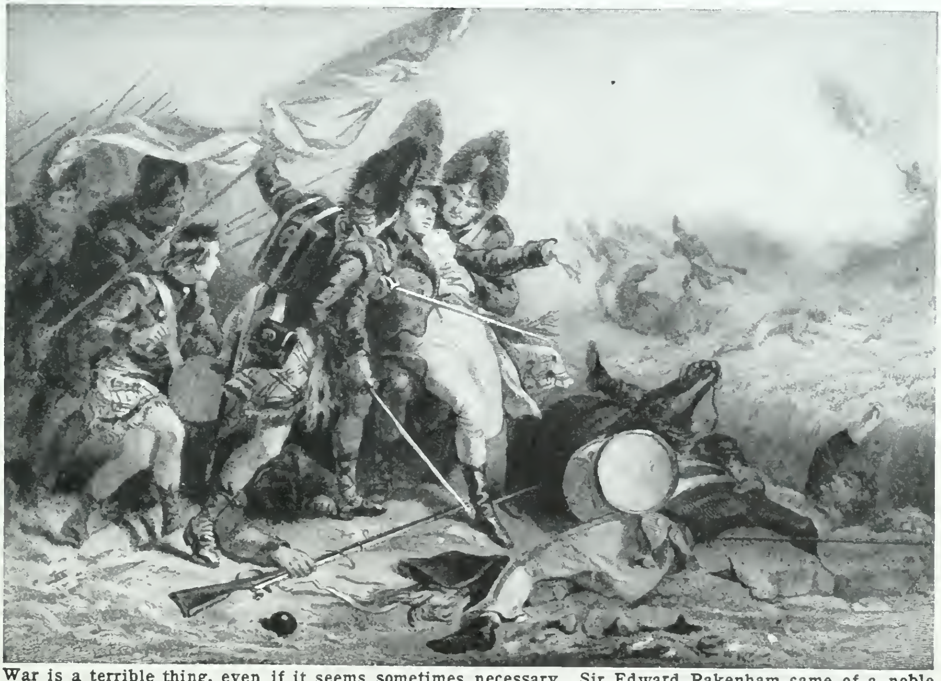
Though the westward movement of the people had been great before the war, it was many times greater afterward. Thousands left the eastern states every year to make new homes in the wilderness. Forests were cleared, farms were planted, and towns sprang up almost like magic. In The Growing West we tell you more of this great movement.

THE NEXT STORY OF THE UNITED STATES IS ON PAGE 1787.

A BATTLE FOUGHT AFTER PEACE WAS MADE

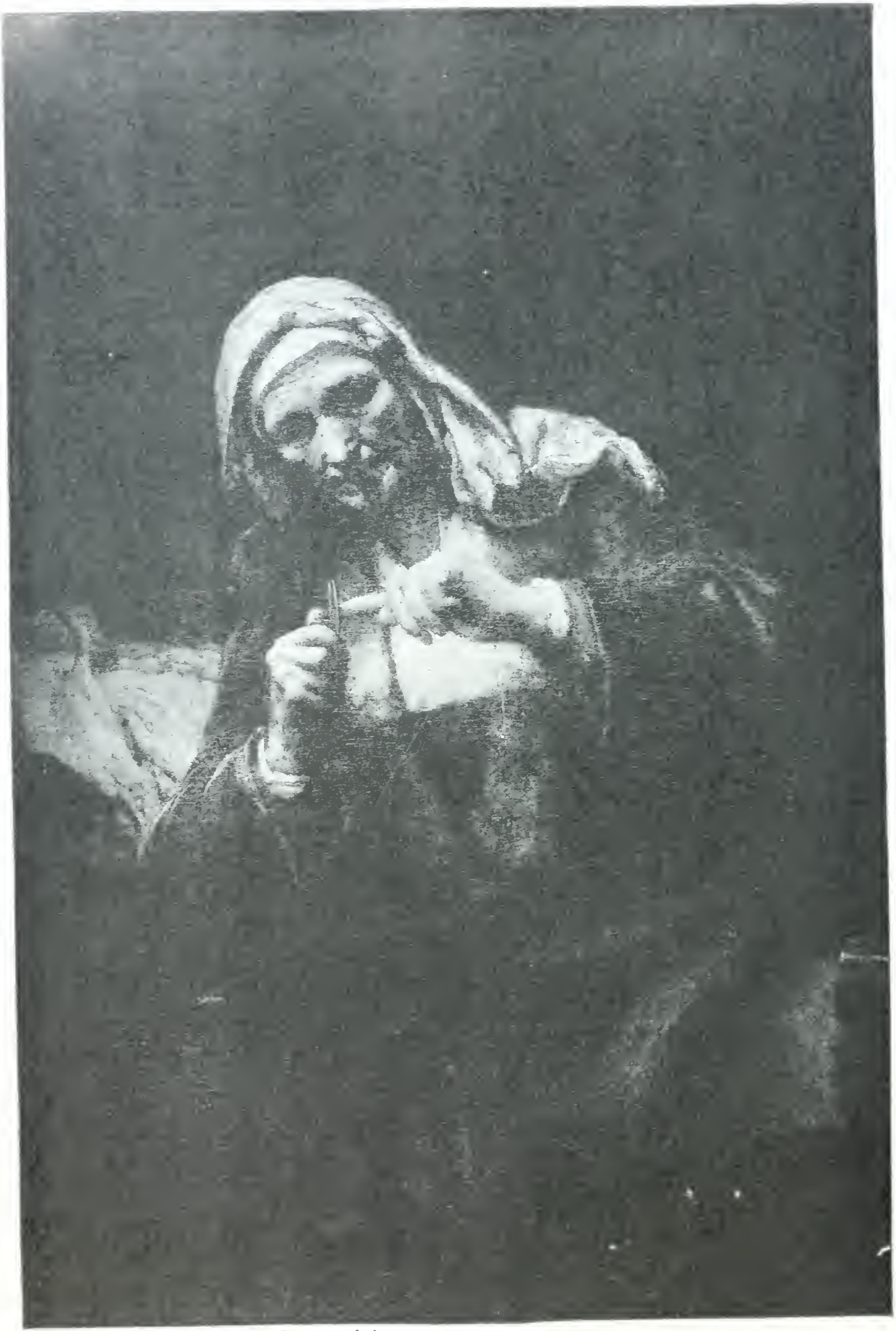


The battle of New Orleans, January 8, 1815, is one of the most astonishing in the history of war. Here Wellington's veterans, supposed to be the best soldiers of Europe, were put to rout by a crowd of untrained backwoodsmen under a leader who had had no regular military training. Here we see General Jackson behind his breastworks, which had been hastily thrown up, but which proved themselves sufficient.



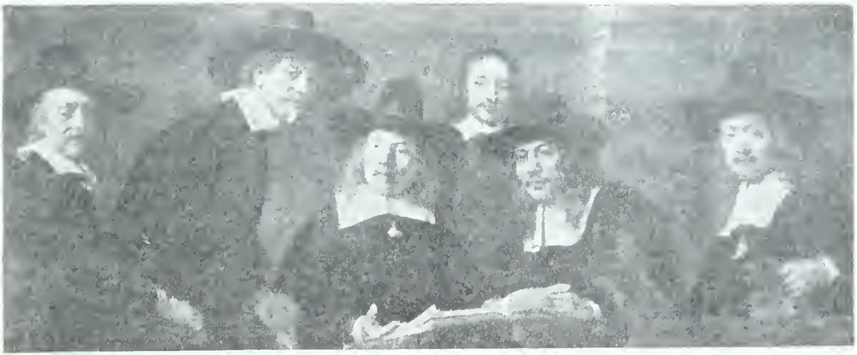
War is a terrible thing, even if it seems sometimes necessary. Sir Edward Pakenham came of a noble family, had won great reputation as a soldier in the wars with Napoleon, and came to America expecting to increase that reputation. He undervalued the American forces at New Orleans, and so rashly attempted to storm the breastworks, instead of marching around the small American force, and fell himself.

A REMBRANDT MASTERPIECE



Photo, courtesy Metropolitan Museum of Art.

Old Woman Cutting her Nails, in the Altman Collection, New York.



Rembrandt's fine picture of The Syndics of the Cloth-workers' Guild, in Amsterdam.

REMBRANDT

IF you look at the picture on this page with inquisitive eyes—eyes that look into it and inquire what makes it different from many other pictures you have seen—you will be trying to find out something of Rembrandt's secret. And that is a problem which has interested the world for years.

This picture, The Syndics of the Cloth-workers' Guild, is the achievement of the artist's ripe years, when he had long studied and worked to give his own impressions of light in paint upon canvas. His use of *chiaroscuro* (values of light and shade) is peculiarly his. By it he produces the feeling of form, and of more than form; in the faces he has recorded we perceive more than features copied in color. We get a glimpse into the real being beneath the flesh and blood. "The heads are enveloped in darkness, out of which emerge the features, the eyes especially arresting the attention. Through the depth and poignancy of their gaze one seems to look into the very soul of the subject."

The greatest art is never merely photographic. Genius sees a plain street of ordinary houses with one crooked chimney, perhaps, reaching toward the stars, and paints the scene so that this is the road to El Dorado, and coming and going along it are beautiful fancies that touch us with golden finger-tips in passing.

This separate eye of genius is one of the world's most precious possessions. Rembrandt was always conscious of his own secret vision. He had the clear insight of the artists of Holland into the beauty of everyday things and people, and if he had been just a Dutch master and not a world genius, he would have found an infinite satisfaction in painting faithfully scenes from his native land. As it was, the perfection which was the goal of the Dutch artists was his starting-point. He took for granted the things everyone else saw, and concerned himself with what they did not see—his secret.

In the same way Michelangelo took the perfection of the human form for granted, and built up his own world of men and women as he saw them—humanity invested with something of the largeness and strangeness of divinity.

Rembrandt Harmensz Van Rijn could not conceive of working in any other way than his own. From the first he was very sure of his ability, and at eighteen—an age when most artists were still at the apprentice stage—he took a studio of his own and announced himself an artist. His father, a miller, had sent the boy, while he was still young, to a Latin school, to prepare for Leyden University. After a year of schooling there Rembrandt showed so plainly that art, and not letters, was his calling that his parents apprenticed him to a Leyden painter called Swanenborch.

There for three years Rembrandt studied drawing and painting; after that he went to Amsterdam to work with Lastman, a Dutch artist who had studied in Italy and was much influenced by Caravaggio, the realist. For six months the youth worked with this painter; then quite suddenly he threw down his brush and went home, saying he was going to work in his own way.

THE TIRELESS GENIUS WHO MADE NINE HUNDRED MASTERPIECES

This faith in himself was justified. In 1631, after three years of private study, Rembrandt, then about twenty-five years old, went to Amsterdam and there began a career of most amazing industry. He painted portraits and pictures for the wealthy, and made etchings for his poorer patrons. Apart from those which have been lost, and his earlier studies which he himself destroyed, this marvelous artist executed six hundred pictures and three hundred etchings. He seems never to have had an idle moment; in the earlier years of his profession he must have lived with an etcher's needle in his hand and a copperplate before him; and to this passion for the engraved line, and Rembrandt's determination to be himself and express that which he saw in his own way, the artist owes his place as the greatest etcher and one of the greatest painters the world has known. At the age of twenty-four he had "left himself no room for improvement" in the art of etching.

HOW REMBRANDT LEARNED TO PAINT THE THOUGHT BEHIND THE SMILE

In the course of his life Rembrandt painted and drew a variety of subjects, but all his interests really focused on the human face. His own eye was sensitive to the faintest shadow of change passing over a man's countenance.

Knowing so much and seeing so much, he made haste to record it. His father and mother, who must have been patient souls, allowed themselves to be drawn a great many times in all the moods and tempers which either the accident of the moment or their son's despotic will dictated. Or he would use himself as a model, sitting before his copperplate, needle in one hand, mirror in the other. Thus he drew his own face repeatedly, serious or smiling, "the artist with frightened eyes," "the artist with a scarf round his neck" and "the artist" in many other varieties of costume.

There were two far-reaching effects of this tireless industry: one was Rembrandt's ability to render easily every conceivable expression of the face, the other was a supreme mastery of technique.

THE WONDERFUL ETCHING OF THE RAISING OF LAZARUS

If we look at his large etching The Raising of Lazarus we shall see there surprise, consternation and other natural emotions drawn on men's faces in a way that is unrivaled in the story of art. It is not an easy or manufactured emotion that the artist shows: each man seems amazed or horrified in his own peculiar way, as his character dictates. We can almost follow the men home and hear them talk about the miracle to their friends.

A similar interest is attached to what is perhaps the most famous etching in the world—Christ Healing the Sick, known as The Hundred Guilder Piece. The artist never quite finished this etching, but as it stands it is a study we should not weary of looking at. On each of the faces Rembrandt has stamped the individual soul. The draftsmanship is superb; not a line is wasted. When, not long since, there came to light an old collection including a number of Rembrandt etchings, three of these, a fine impression of The Hundred Guilder Piece and two others, were sold at nearly $6,000 each.

THE MASTER'S TOUCH THAT MAKES A PICTURE SEEM TO LIVE

Rembrandt's technique was a separate gift. At first his line was a little tight and hard, as in the early etching of himself about the age of twenty-one. Presently it became loose and vibrating, very gentle and very strong at the same time, as in the incomparable etchings of his mother. As his line loosened, his brush work loosened also; at times he has the freedom of Velasquez, that supreme genius of technique.

Technique in drawing and painting, as we know, is the craft of art; that is to say, a person without any vision of beautiful things may be able to draw a perfect line. With some artists technique is the beginning and end of their peculiar gift. Very often too much attention to technique will kill the freedom and spontaneity of the artist's thought. Technique is concerned mainly with two problems: outline and shade masses. An outline is really false to nature; faces can no more be truly represented by an outline than an orange can be represented by a circle.

The only true rendering of solid objects is in modeling or sculpture. But there are degrees by which the outline can attain to the qualities of sculpture. That is to say, a great master can, by a single outline, give the illusion of a rounded form. Generally speaking, the tighter a line is, the farther it is from representing a solid object. Michelangelo's cartoons or sketches, Goya's drawings and Rembrandt's etchings will show us what a loose, vibrating line is.

THE GREAT GIFT AND DEEPEST SECRET OF REMBRANDT

The dealing with masses, showing light and shade, is another and stouter problem. If you look at a person's face, particularly in lamp-light or candle-light, you will see that part of the features, the nose or the cheek bones or the chin, are very clearly in high light; other parts of the face are very clearly in shadow. If a face were made like a solid cube there would be an end of the matter. Anyone who can draw at all can draw or paint the high lights or the strong shadows on a face; that which artists spend years in trying to render is the part where high light slips into dark shadow; the tiny planes on the rounded flesh that join up the two extremes of white and black.

Here Rembrandt's technique was superb. A few lines, a little work of the brush, and he was across that terrible no man's land which many artists never cover at all. Leonardo da Vinci was another genius who had mastered this most difficult problem in portraiture.

But when we think of Rembrandt's art from the point of view of characterization, great as it is, or of its marvelous technique, we have not touched his outstanding genius. Rembrandt got into his work a luminosity—very different from actual light-and-shade treatment—which has never been found either in etchings or paintings before or since. In etching "no other master ever made white paper radiate as he did." This luminous atmosphere—in his etching and in his painting—was Rembrandt's secret, his genius, his gift to the world.

Anyone can make light light and darkness dark. Rembrandt made his darks glow with light, his lights hold a peculiar soft gloom. "He surrounded centres of light with waves of darkness. The darkness itself in his pictures is transparent; you can peer into it and discover half-concealed forms; everything provokes curiosity; there is mystery; and it acts upon the mind so that the real and the imaginary become mingled. It is at once a reality and a dream." A secret that can be told is no longer a secret. To attempt to explain Rembrandt's supreme genius is as difficult as it is to copy it. In some moods he seems to have tried to use light as actual material with which to build form; he seems to have composed in light.

The Venetians got light into their pictures, and often a gentle suavity; but they were painters willfully making beautiful things a little more beautiful—painters dealing with subjects of religious or classic story that were already full of interest in men's minds and only needed to be painted to become adored.

HOW REMBRANDT LOVED TO PAINT THE PEOPLE OF HOLLAND

When Rembrandt painted a religious subject he often gave it a genre feeling. For instance, in a Holy Family, now in Munich, he represents the father and mother in a Dutch home, bending over a familiar Dutch cradle in which lies the Babe. And instead of gods and princes, queens and nymphs, this artist chose for the figures in most of his pictures humbler folk, sometimes the ragged and poor. Yet there is nothing commonplace in these creatures, for the man who put them on canvas or paper saw human beings in a broad, sympathetic way, and gave character and dignity to their forms and faces when he drew or painted them. A gesture or a turn of the head might have the force of presenting some universal truth.

Not only the number of Rembrandt's works but the wide variety of subjects and kinds is astonishing. Of them all, as we have said, the portraits are of most importance and interest. True as likenesses, expressing the characteristics of each individual, they are interesting as pictures, too. Some of his portraits of old women are unequaled in the way they embody the calm dignity and courage of age, and record the traces of experience—the fruit of living. Stiffness and firmness may still be there, but sharpness has been smoothed away by the touch of time. Into just the folded, quiet hands of an old woman Rembrandt could put such beauty and meaning that the sight of them almost brings tears of tenderness. A transparent delicacy or a sturdy capableness gives them distinction and suggests what part they have played in a long lifetime. No other has been so sympathetic a painter of old age. It is the impression made upon the painter himself that comes to us through the picture he made. We see his beloved young wife Saskia, or his good friend Jan Six, or his son Titus, as he saw them.

REMBRANDT AND HALS AS PORTRAIT-PAINTERS COMPARED

If Hals and Rembrandt are put side by side as portrait-painters, certain differences can be clearly noted. Hals is like one who can tell a tale quickly and brilliantly. His easy strokes play over the surfaces with ready skill, which can be understood and followed. Rembrandt's portraits, on the other hand, are built up, "constructed" with solid strength, giving evidence of bone and muscle beneath the surfaces. His is an art that cannot be expressed in a formula and imitated.

Yet when these two artists were engaged to make large group pictures for corporations, the method of Hals gave the greater satisfaction to the patrons. In his groups each solid citizen was unmistakably represented by an excellent portrait, whereas in Rembrandt's the portrait quality might be made second to the picture composition. This is particularly true of the Sortie of the Banning Cock Company, in Amsterdam, where the figures emerge from such deep shadow that the picture was long called, by mistake, The Night Watch. One whole figure and a few heads furnish "some focal spots of brilliance," but most of the personages are indistinguishable in the shadowy gloom, which has grown deeper with time. Instead of being ranged in neat rows, the members of the company are shown rushing out of their club-house —coming forward from the dim background. The Banning Cock Company were disappointed, but their picture stands as a record of Rembrandt's struggle between the impulse to give a detailed representation of outside appearances and the desire to express inner impressions of his own mind.

An early group picture, The Lesson in Anatomy, however, had made Rembrandt famous because of its clear characterization. And The Syndics of the Clothworkers' Guild, in the Rijks Museum, Amsterdam, painted near the end of his life, brings together at last the two efforts in a most successful result. It is "a work of imagination and yet of real life."

HAPPINESS AND PROSPERITY FOLLOWED BY DARKER YEARS

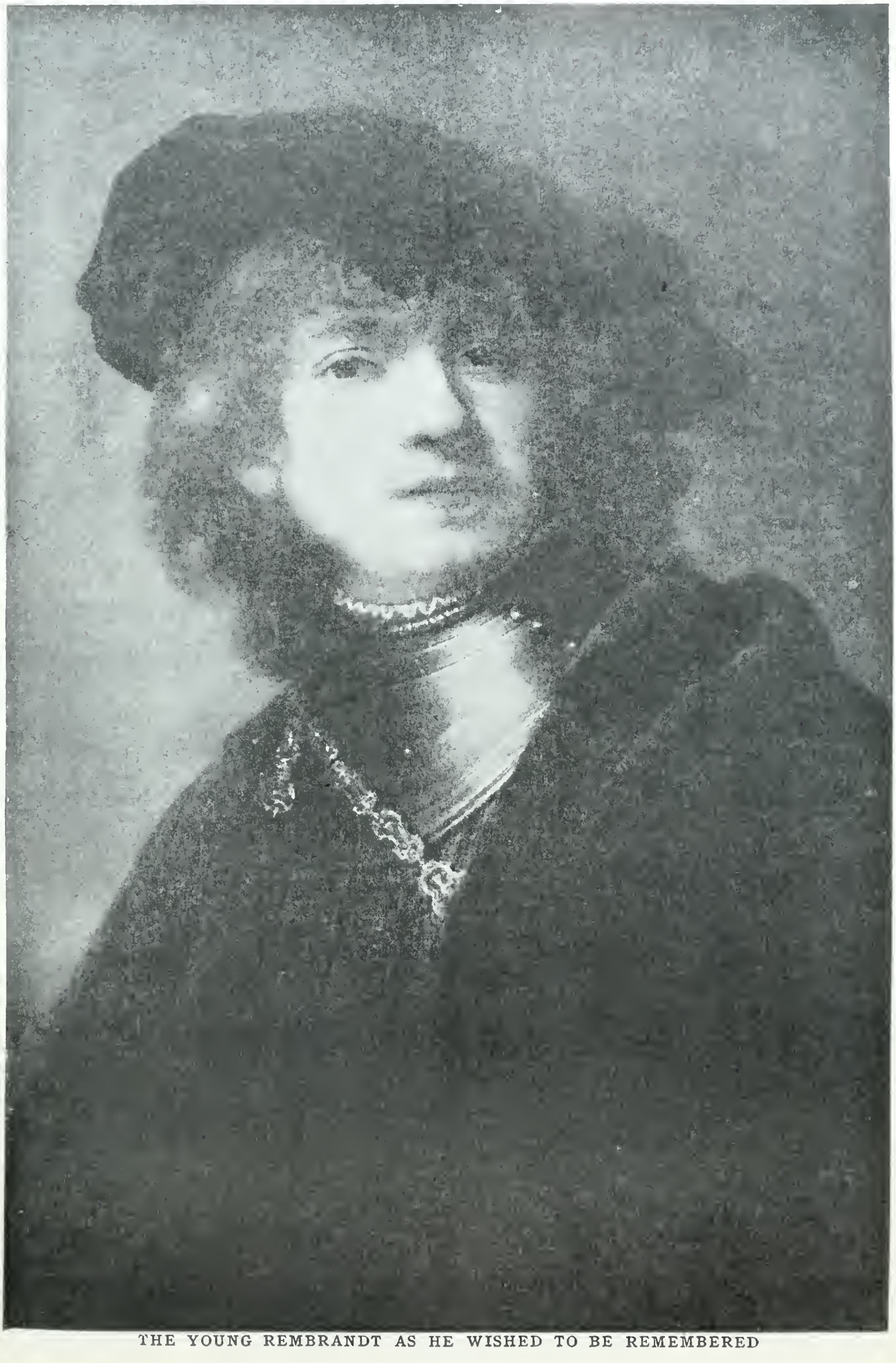
For ten years after he painted The Lesson in Anatomy, Rembrandt lived in prosperity and comfort, busy with pupils and at work on the portraits of patrons. At this time he was happy in his home life with his wife, Saskia van Uylenborch, whose portrait he painted many times. Reveling in the beauty of sumptuous materials, he bought freely and lived generously. In these years of vigor and youth Rembrandt dipped his brush into many colors; as he grew older his tone was quieter, his color more restrained.

In 1642 Saskia died, and in the same year his Banning Cock Company picture gave dissatisfaction, injuring his popularity. The rest of his life was darkened by money troubles, although he painted with extraordinary industry and was faithfully helped by his son Titus and by Hendrickje Stoffels, a devoted servant, until she died, in 1656. There is a fine portrait of Hendrickje in Berlin.

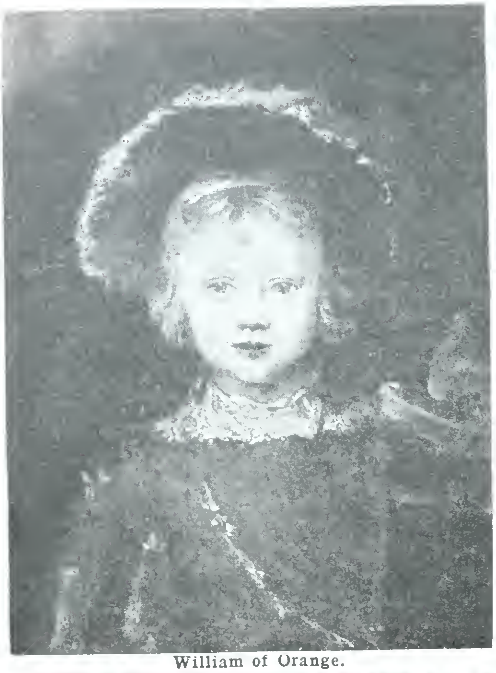
As in the case of Michelangelo, Rembrandt's last years were lonely and sorrowful, though there was in his temperament none of the moroseness and sourness which kept from the great Florentine the joys of friendship. Rembrandt's failing, rather, was that he had been spendthrift —too generous, too trusting and too sure of the world's kindliness. But he would have been the last person to think his case over-sad. The thing that mattered most to him was his work, and this he had brought, in evil report and good, to a triumphant end. Born about 1606, he died in the year 1669.

While London, Paris, Dresden, Berlin, Petrograd and other European cities have notable paintings by the Dutch master, the great mass of his work is in Amsterdam and The Hague. In America, New York is especially rich in paintings by Rembrandt, and there are examples of his work in Chicago, Philadelphia and other cities of the United States.

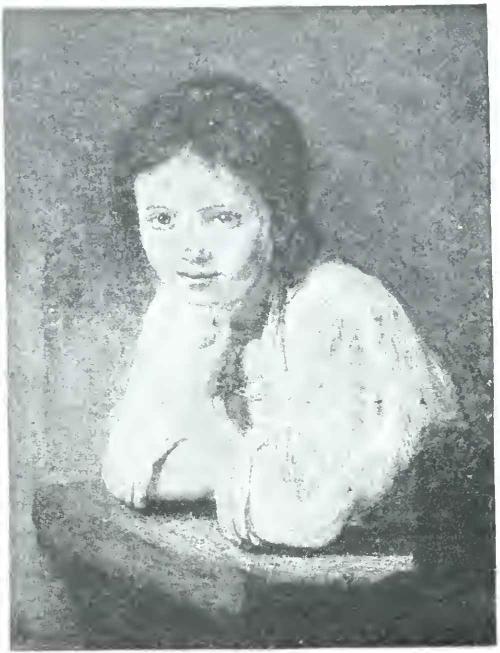
THE NEXT STORY OF THE FINE ARTS IS ON PAGE 1873.



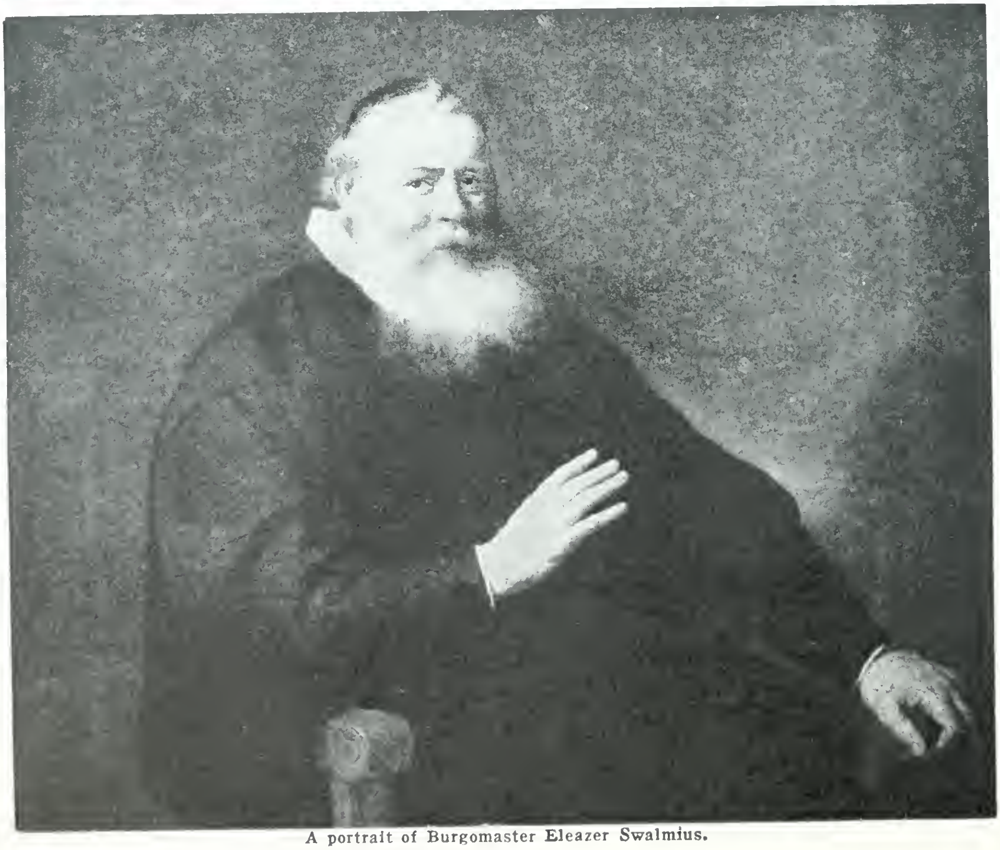
THE YOUNG REMBRANDT AS HE WISHED TO BE REMEMBERED



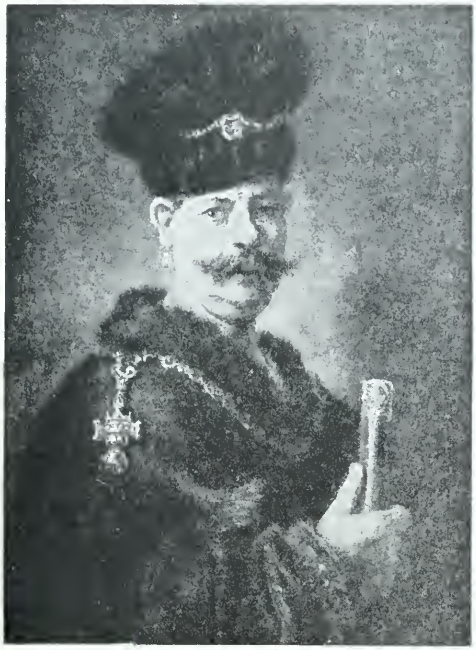
William of Orange.

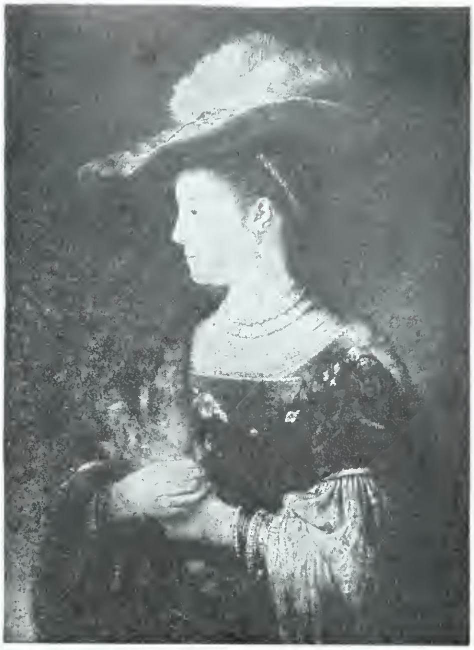


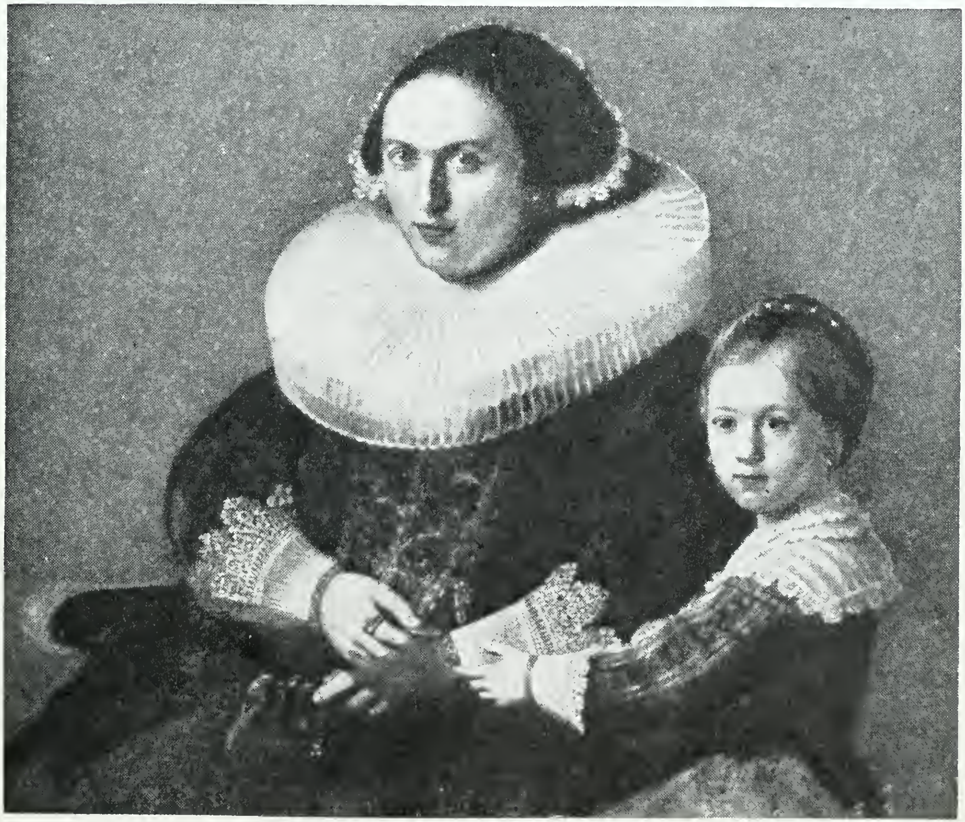
A Girl at a Window.

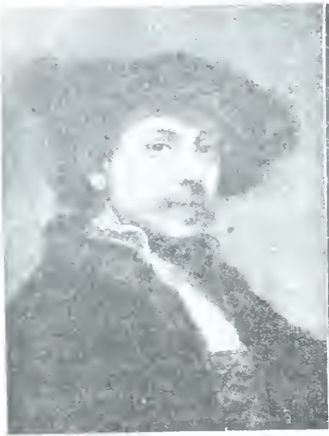


A portrait of Burgomaster Eleazer Swalmius.

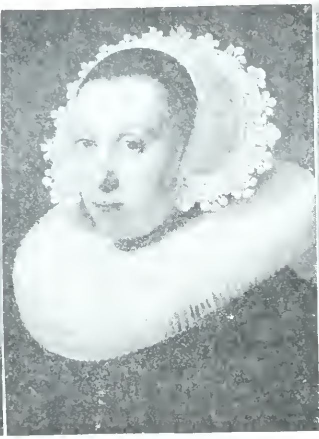

A Polish Soldier.


Rembrandt's Wife, Saskia.

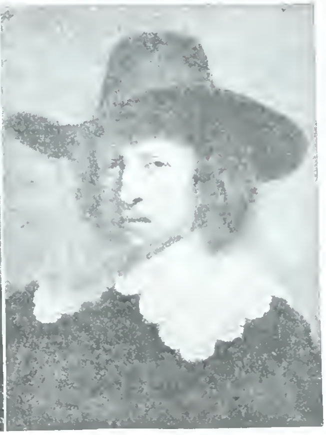

Suzanna van Coller with Her Little Daughter.



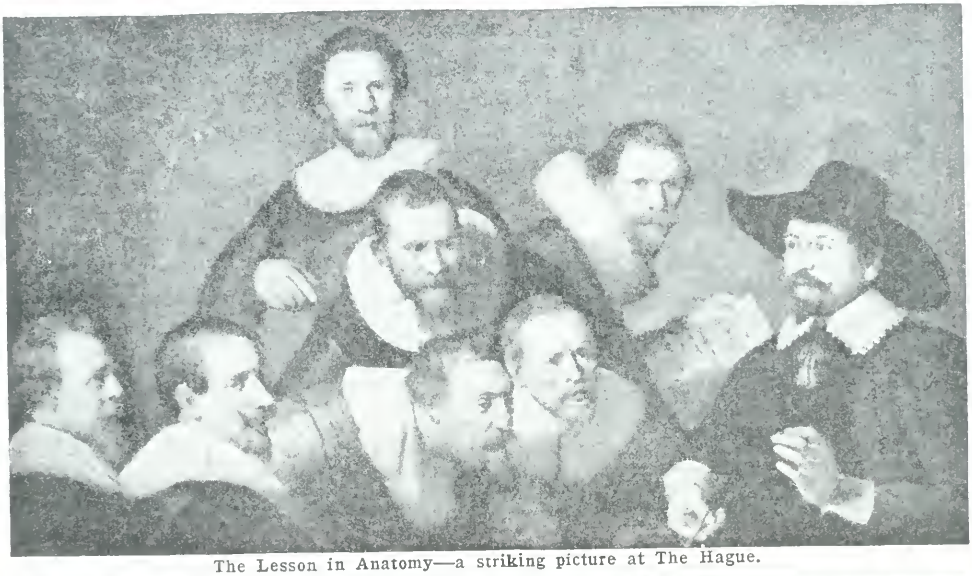
Rembrandt as a Young Man.



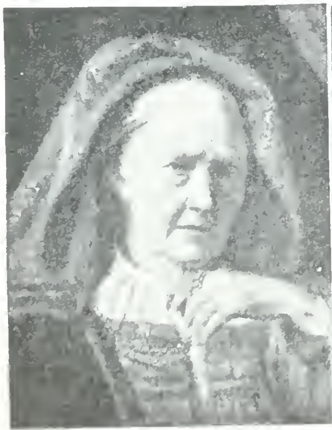
Portrait of a Woman.



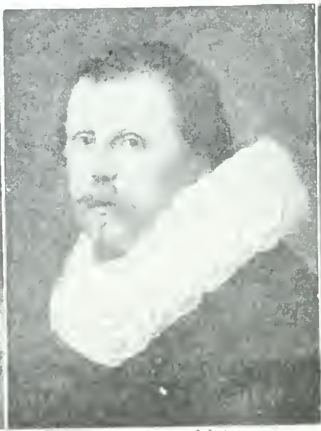
Study of a Man.



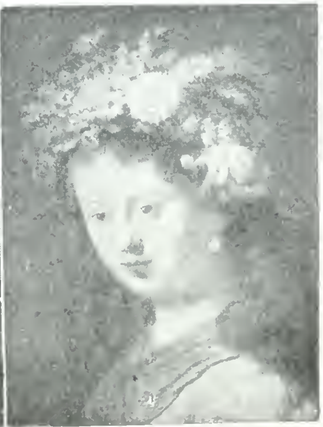
The Lesson in Anatomy—a striking picture at The Hague.



Rembrandt's Mother.



The Caligraphist.

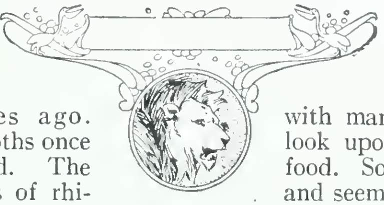


The Flower Lady.

The photographs of many of these paintings are by Messrs. Bruckmann and Hanfstaengl.

A baby hippo takes a meal.

PIGS AND HIPPOPOTAMUSES



WE have shown you some of the strange animals which lived in North America ages ago. Mastodons and mammoths once roamed over the land. The bones of many species of rhinoceroses have been found. There were queer giraffes and camels and hundreds of other creatures quite unlike anything we find to-day.

On the other hand, some of our commonest animals of to-day apparently did not live in North America, or, if they did, their fossils have not been found. The only representative of the pig family belonging to America is the peccary, and the hippopotamus has not been found at all. The home of the ancestor of our common pigs and of the hippopotamus was the Old World.

All the common breeds seem to have developed from the wild hog of the Old World. When man first tamed the creature we do not know. Some of the earliest writings we have speak of swine. To be sure, they were eaten by man long before they were tamed. Long after man claimed ownership they were allowed to range the forests picking up their own living, and were hunted and killed when needed. Even to-day there are fierce half-wild pigs in America, but nowadays most of them are confined by fences and have lost most of their fierceness. For many pig generations they have lived with man and have learned to look upon him as the giver of food. Some become quite tame and seem to show real affection for those who take care of them. Only occasionally does one attack man.

In Europe the wild boar as a species is not by any means extinct. French hunters killed two thousand wild boars in Limousin alone during 1921. We realize at a glance from those figures how civilization views this sturdy ancient. The Government of France awards a reward for every boar weighing between six and thirty pounds that is killed. For animals of over thirty pounds they pay no reward, as an animal of that size is in itself a sufficient prize for its flesh and its hide. The others have to be paid for because they are so destructive to crops.

Courage and audacity, allied to great strength and considerable cunning, meet in such an animal. It has a tough and hairy hide, fair speed for a sprint, and dangerous weapons. The short up-curving tusks in the upper jaw and long tusks from the lower jaw make the creature terrible to behold. The long, powerful snout is an ideal implement for rooting up soft earth and all that grows in it.

The same species roams throughout a great part of Europe now, through Northern Africa, and far and wide in West and Central Asia. The wild boar is common in India and adjoining lands. It is closely akin to the European, but branches out into more than one variety. There are big Indian boars which stand to fight—or even invite a combat; there are lighter ones which run first and fight only when brought to bay.

THE WILD PIGS OF INDIA AND THEIR REMORSELESS FOE

No other large animal multiplies so rapidly as a pig. The litters are frequent and the numbers amazing. In densely populated India the boar has kept pretty much to jungles, and preys upon cultivation only when cultivation advances toward his home. Wild pigs are part of the natural food of the tiger, and if pigs should fail, the tigers turn more and more to men.

Strange and unexpected are the effects of some of the methods of civilization carried into the wilderness. As everybody knows, rich rubber plantations have recently been established in the East. The interference of man-eating tigers has at times interrupted the work of the planters, so that tigers have been ruthlessly shot down.

But there are precious oil-palms there, too, and the result of the thinning-out of the tigers has been that the wild boars have increased beyond calculation. In 1920, therefore, the Governor of Sumatra put tigers under government protection. This was done in order that these carnivores might be left alive to police the places where the wild boar attacks the oil-palms. It is not to be supposed from this that wild boars fear the tiger. The younger ones may, but the full-grown boar is not afraid of anything. He will charge a mounted man as soon as he sees him, and he meets the tiger on terms of equality.

Wild boars have their hours of madness. An English hunter returned one day to an Indian village where he was temporarily quartered. He found all the native inhabitants up trees, and a huge boar rampaging through a plantation of castor-oil plants.

THREE HUNDRED POUNDS OF DESPERATION AT WORK

It seemed that the animal had trotted into the village and, without provocation, had attacked seven people in succession. The hunter and a friend, both mounted, set out in pursuit. The pig dashed out, lacerated one of the horses, then charged the hunter, tore open his horse's flank and its rider's leg and chased them for forty yards before retreating.

Dogs and a crowd of natives drove him again into the open. He started to run away, but hearing the hunter's horse overtaking him, turned and charged with all his force. He died fighting, speared through and through. Yet he was only thirty-three inches high, with seven-inch tusks! The real warriors of the breed range up to forty-three or more inches, have tusks of nine inches, and weigh over three hundred pounds.

That was the kind of animal common in England down to Shakespeare's day. The kings preserved wild boars as they began to grow scarce, and men were severely punished for interfering with them. The same was true if he slew the king's deer.

THE IMPORTANCE OF THE BOAR IN THE DAYS OF ROBIN HOOD

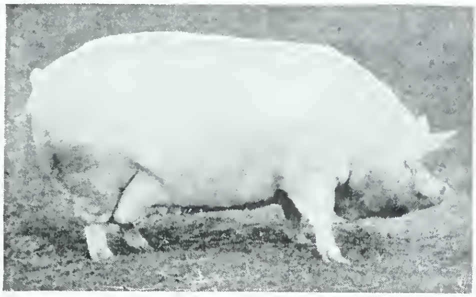
Many old tapestries and pictures preserve for us scenes of royal hunts. Very severe were the enactments against those who aimed a blow at these royal creatures. King John, when he was letting the throne of England slip from beneath him, was very gentle to his swine. Yet, in spite of all the king's horses and all the king's men, there were Robin Hoods and Friar Tucks in real life who risked the penalties for the satisfaction of a duel with the savage animals. By his own royal order King John, in the midst of affairs which made his crown rock on his brows, commands his royal constable to go and take wild boars for him and to send them to him, "the meat well salted and the heads soaked with wine."

HOW MEN TAMED THE WILD BOAR, AND HOW IT REWARDED THEM

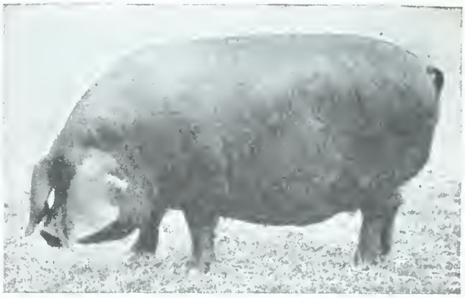
The domestication of the pig was one of the early triumphs of men in Europe. There was only the wild boar to take, and they took it. They tamed it more or less, and for many centuries the pig was the poor man's chief possession. Sheep, cattle and horses were for men of higher estates; the wretched peasants must say: "Our hoard is little if our hearts are great."

The pig was the scavenger. There was no sanitary system; the pigs were the

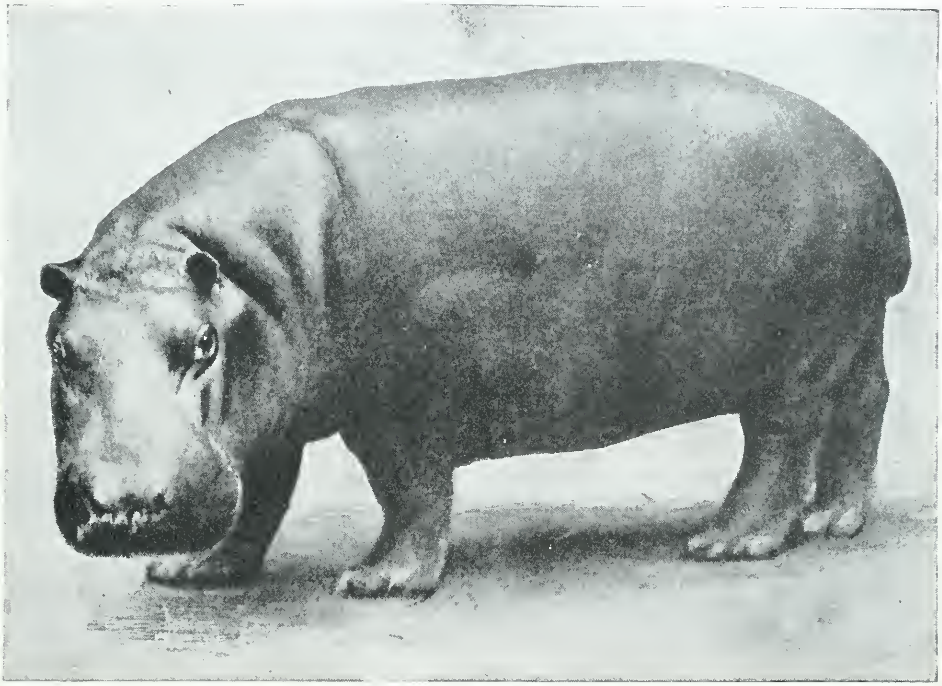
THE PIG AND ITS STRANGE COUSINS



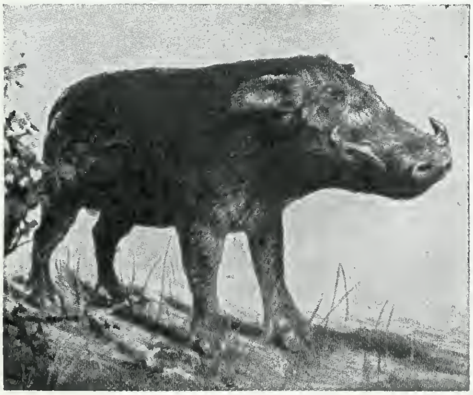
Large Yorkshire.



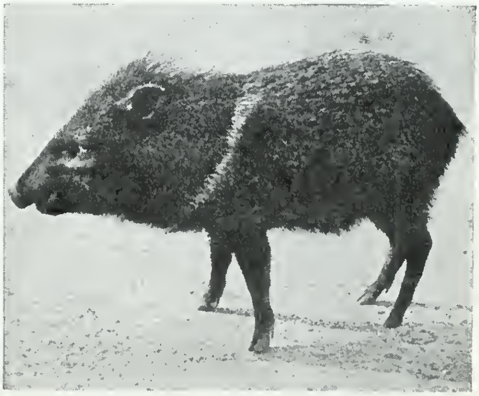
Large Black Sow.



A Hippopotamus from Africa.



Forest Hog of Africa.



Collared Peccary of America.

garbage-collectors. They cleared the streets by eating all that could be eaten. Therefore they were cheap to keep. In the autumn there were woods to which they could be taken for grass and for beechnuts and acorns.

Much of that wonderful picture of Saxon-Norman life in the opening chapter of Ivanhoe is true to the facts as we have them from old records. Gurth, swineherd of Cedric of Rotherwood, typifies a class. The poor peasants also employed swineherds. They could not leave their toil to go out with the pigs, so a whole village clubbed together to pay a man for the purpose, and he led forth the pig family of a community to eat the food dropped from the trees of my lord.

THE PIG THE POOR MAN'S DEPENDENCE

So long as they could get salt the villagers were sure of some sort of meat, however poor, for the winter. The pig was killed at the end of autumn and was their stand-by for the dark and hungry days to come. Disease was rampant in the surroundings of the "good old times." Ague, leprosy and other ills were constant with the people, even when Plague and Black Death were not striding in at the seaports; and the pigs suffered from horrible diseases.

Skill and patience have bred away the lean and scraggy pigs which those unhappy days produced. The world has been searched with a view to improving the stocks, with the result that now there are many varieties of pigs in Europe and America.

WHERE THE PIGS WE KNOW COME FROM

The parent stock of most pigs found in Canada and the United States was brought from Europe, and chiefly from England, though the settlers from other countries also brought pigs with them. Several new varieties have been developed by crossing. However, there is much variation, both in size and shape, among the individuals of a breed, and many pigs you see cannot be said to be of any particular breed.

Three of the most popular breeds were brought from England. The Large Yorkshire is an enormous white hog which often weighs more than a thousand pounds. The Tamworth, a large reddish hog, is supposed to be most nearly related to the European wild boar. The Berkshire, a black hog with white markings, is somewhat smaller than the others. It originated in the county of Berks. All of these are common in America. The Essex and the Small Yorkshire are small English breeds, which have not become popular in America. The Large Black and the Lincolnshire Curly-coated are English breeds seldom seen here.

SOME BREEDS DEVELOPED IN AMERICA

Three other popular breeds were developed in the United States. The Chester Whites probably arose from a cross between the Yorkshires and some Chinese pigs. The Duroc-Jerseys are red in color, and were first bred in New Jersey and New York. It is thought that some Portuguese or Spanish blood helped to form them. The Poland-China is black and white, and probably arose from crossing Berkshires and some Chinese pigs. In all cases there was much careful selection of individuals showing the qualities desired. Another American hog, the Hampshire, is black with a white band around its body.

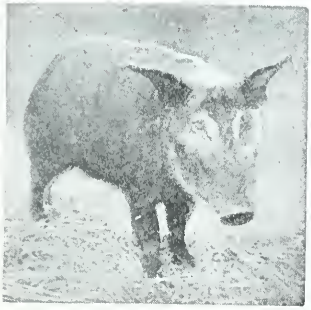
Hogs are sometimes divided into lard-hogs and bacon-hogs. The Large Yorkshire and the Tamworth are bacon-hogs, and for this reason are popular in Canada. The others we have mentioned are generally classed as lard-hogs, because they carry more fat than the two first mentioned. All of them except the Chester Whites are smaller than the two bacon breeds, though some individuals are very large.

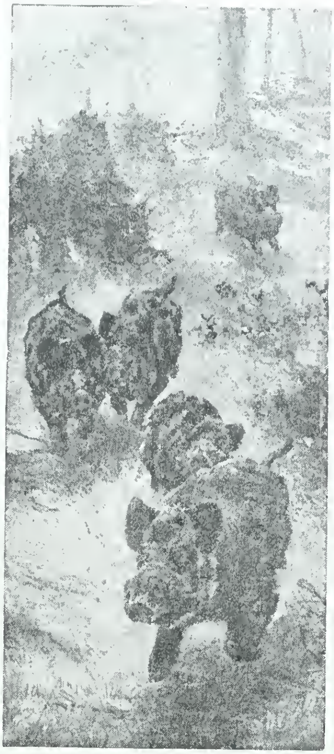
THE MANY WILD PIGS OF THE OLD WORLD

There is no Gurth, son of Beowulph, to herd the swine of the wilds, and they need no attention. The wild ones all have general-utility teeth like the domestic varieties, so that they eat anything, from carrion to corn, from snakes to sugar-cane. They are all said to be able to withstand the effects of snake poison, and certainly a snake is a titbit to all known species.

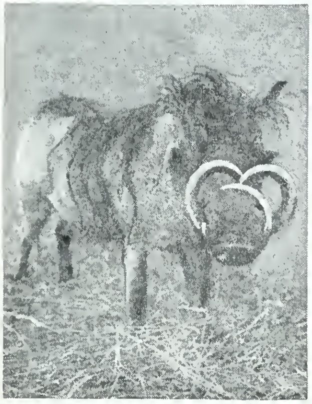
There are Pigmy Pigs no bigger than hares in some parts of India. When we turn to Africa for further examples of pig life we find that south of the Sahara the typical wild-boar type disappears and its place is taken by what are called Bush Pigs. In addition to slight differences from the rest in point of teeth, they are all distinguished by the presence of large swellings on each side of the face.

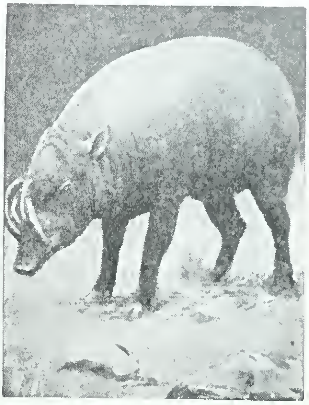
QUEER DWELLERS OF THE OLD WORLD

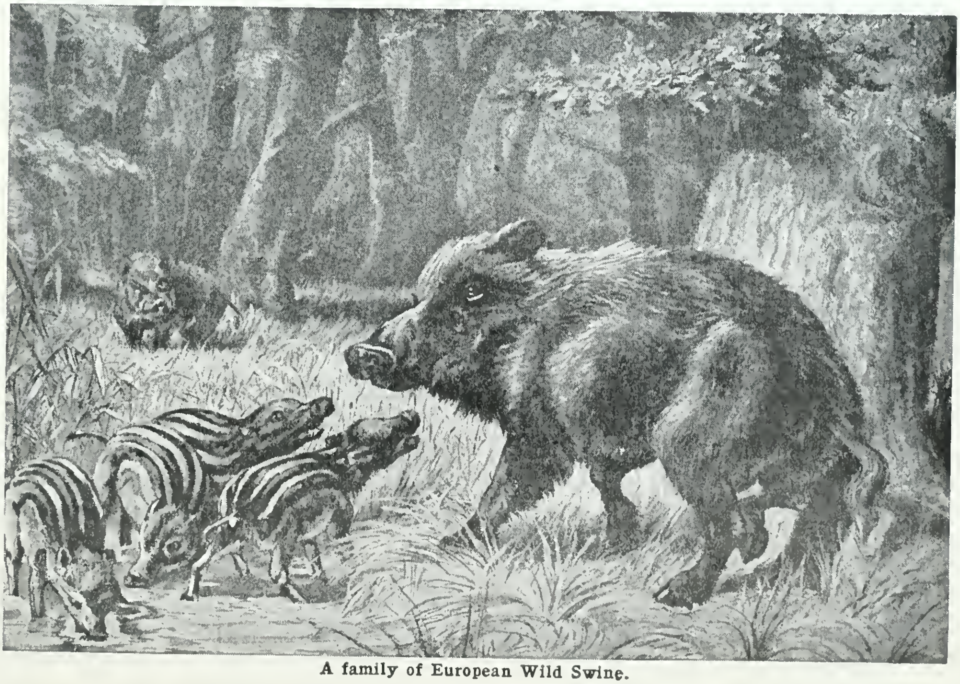

Red River Hog.


Wild Boar on the march.

European Wild Boar.


Ethiopian Wart Hog.


Babirusa.


A family of European Wild Swine.

The most notable of these bush pigs is the Red River Hog. Its long, bristly hair is a brilliant brownish red, with white and yellow intermixed, and forms a mane about the throat and a conspicuous tuft at the end of the tail.

THE BIGGEST PIG AND ITS TERRIBLE WEAPONS

The great growth of tusks in wild boars is sometimes attended by disaster. Though the upper and lower meet, and so keep each other in check, one of these weapons, if an accident breaks its opposite, may go on growing until it enters the animal's brain. But note that freakish pig the Babirusa. The name is given to the animal by the natives of Malaya. They see in its weird tusks a likeness to antlers, and their word *babirusa* means simply "pig deer."

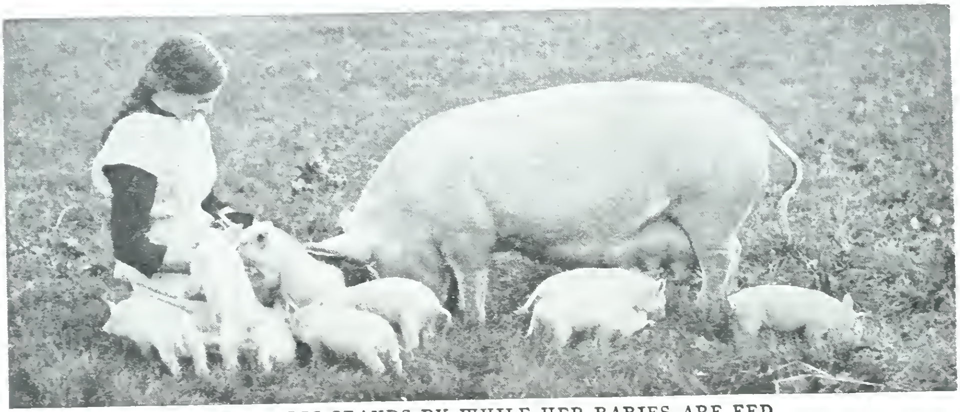
The babirusa's upper tusks rise, not from the jaw, but from the centre of what we must call the forehead. They curl up and sharply backward; then curl again when about to touch the head, and continue growing in safety. What purpose such weapons serve is not clear. Probably an original defense has been exaggerated in course of time into ornament. It may be that the ladies of the species love best those males which have the curliest tusks.

The Forest Hog, the biggest beast of all the family, has tusks of great size, but their curl does not take them out of service. They are weapons of offense more formidable than any we have yet studied. Big as he is, the forest hog is little known. Livingstone and Stanley both heard rumors of him, but dared not believe native reports. Only in 1904 was a specimen examined, and very little is known of him.

RANGERS OF THE FOREST THAT PLAN SAVAGE ATTACKS ON MAN

It is certain that he forms the connecting link between the typical bush pigs and the Wart Hog. If one ever had a nightmare about pigs the wart hog is the sort of animal we might expect to meet. It is hideousness alive.

The eyes are set far back upon a long, fantastic head. It is flat and broad at its lower extremity, with two pairs of warty ridges below the eyes. Then come the great tusks. The upper pair is of prodigious size, the lower ones smaller, so reversing the order common to the rest of the pigs. Inhabiting thorny plains and dense jungle, they often occupy the burrows left by other animals.



MOTHER PIG STANDS BY WHILE HER BABIES ARE FED

Wart hogs commonly enter a burrow backward. This is done for two reasons, perhaps: first, that the hog may be able to fight off any creature that follows it, and, second, that it may be able to leave the burrow head first, and leave it fast, if a hyena is already in the burrow.

Europeans have taken their pigs wherever civilization has set up house. Australia, of course, had none of any sort. America had only a little wild forest pig called the Peccary. The peccaries arose from the common stock when there was land communication between the New World and the Old, but they have developed on lines of their own.

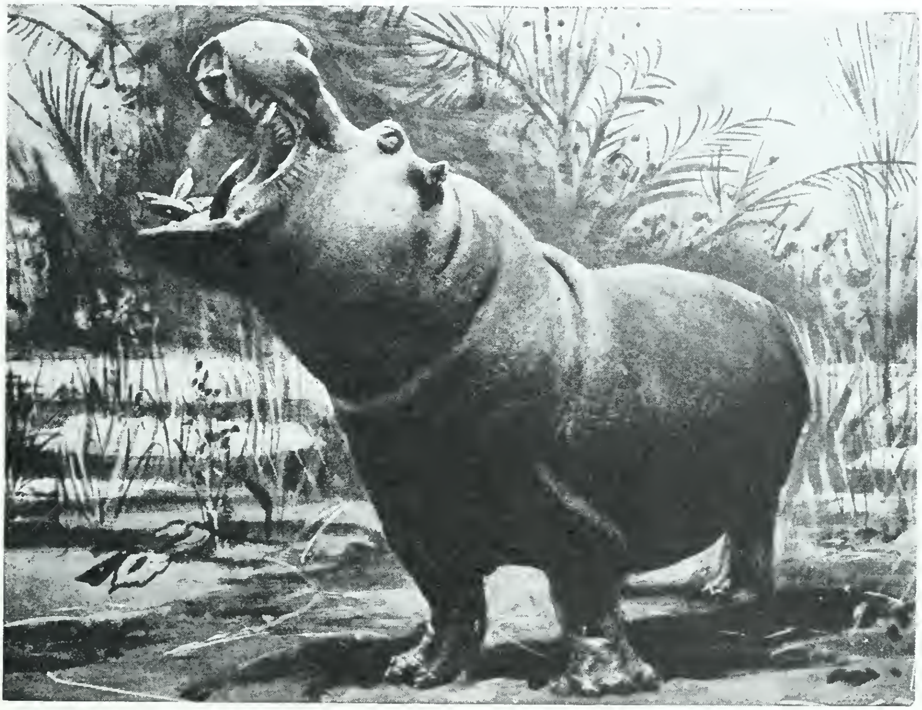
Their upper tusks grow downward; they have three toes on the hind feet instead of four; and their stomachs are much less simple than the stomachs of the rest of the pig family. Long-snouted, without a tail, they have an evil-smelling gland on the back, and they are remarkable for the thinness of their little legs. But all the species into which they are divided are pig-like in most respects—in their herding together and in the brilliant manner in which they combine to fight a common enemy.

So fiercely do they resent intrusion that they will attack and destroy a fierce, bold jaguar, throwing themselves upon him, regardless of losses, till they destroy him. And they show no more fear of a man, but "tree" the boldest hunter as a hunter trees a raccoon.

The Hippopotamus is distantly related to the pigs. He stands alone, of course, in a family by himself, but his remotest ancestry began with the rest of the pig tribe. We call him hippopotamus, which means "river horse," because the old Greeks, who first named him, did so.

On land the title is ridiculous; but when you have seen his movements in deep water you realize that the man who named him saw him at home. For when the greater part of his body is covered by water, the lower part of the huge square head concealed, the arched upper part of the neck revealed, and you catch sight of his forelegs as he paws his way through the stream, he does resemble a horse. He looks like an exaggerated specimen of the coarse-headed arch-necked horses that we find to-day on many a Grecian sculpture.

But he is a pig, a pig of the river and the lake. The biggest mammal on the land, next to the elephant, the hippopotamus is between three and four feet high, from thirteen to fifteen feet long and weighs three or four tons. European specimens of the days long gone were larger, but the survivors astound us. To see an adult hippopotamus open its monstrous red cavern of a mouth is to be reminded that here is the most colossal of all gateways to the stomach, excepting only the mouth of the whale. There is work for such a mouth to do. The body is like a ponderous barrel, and in it there is a stomach



The hippopotamus is one of the largest land animals. It lives in Africa, and spends most of its time in the water. It is able to remain below the surface for as much as ten minutes at a time. It has the power of closing its nostrils so that it can prevent the water from entering. Its great mouth opens like a cavern and has enormous teeth of hard ivory. It has very short legs in proportion to the rest of its body.

[illegible] is not filled until four hundred pounds of food has been lowered into it. Where he lives there is no lack of food to fill that void.

The hippopotamus is more at home in water than on the land. He does come ashore, of course. He comes out by night, pounding along like a sort of stealthy earthquake. If we may say that such a monster creeps, he does it. He creeps timidly, in his huge hippo way, to the cultivated fields of the natives, and converts a load of sugar-cane or growing corn into a toothsome supper.

But, as we say, he is at his best in the water. Nature has fitted him up like a submarine. Those absurd little ears of his close at will like his nostrils, and are watertight when he submerges. His nostrils are placed high on the muzzle so that he can raise his snout a little out of the water, breathe and remain hidden; and the eyes are also raised.

A careful study of the lungs of a hippopotamus would be interesting, for this land beast can stay under water for ten minutes at a time, probably longer. That is prodigious for a land creature of such bulk which needs so much oxygen. That, however, is part of its scheme of efficiency for water work.

THE HIPPO'S RIVER PLAYGROUND AND HIS TUNNELED RETREAT

He shuts up nose and ears, sinks to the bottom of river or lake, and walks along the bed as freely as we walk on land. If he is out of his depth he swims. When he wishes to rest he makes for a bank in midstream or a handy shore, or, best-loved sanctuary of all, retires into the papyrus growing in the upper reaches of the Nile.

Madam hippo is a very kindly mother. The sire may be rather a Turk as a parent, but she is as gentle in her vast cumbersome way as a motherly old hen with her chickens. She plays with her babe like a dog. She takes it into the water with her and teaches it its business, the whole art and mystery of hippo life.

If the water is deep and the little one is tired of trotting at her side, she lets it scramble on to her mighty back. This has a double advantage, for it saves the strength of the little one, and it also enables him to pop his plump young nose out of the water to breathe more frequently than is necessary for his mother. It was this typical hippopotamus that old Europe knew. One species exists to-day which apparently Europe never had. That is the Pigmy Hippopotamus of Liberia, Guinea and Sierra Leone. In size it is pig-like, about thirty inches at the shoulder, and not half the weight of a large Yorkshire boar, being only four or five hundred pounds.

THE TINY WEST AFRICAN HIPPO THAT LIVES IN THE FOREST

Though, like all the pig tribe, the pigmy hippo loves a mud-bath, it does not live near rivers, as the giants do. It keeps more to the wild undergrowth of the forest, where it hides with ease from the hunter. Its scent is keen; it detects the presence of a human enemy, and steals away quietly just as elephants do.

The big hippo, though confined, of course, to the tropics, is a hardier animal than is generally known. In captivity it has brought forth young not only in the difficult climate of London but in the United States, Germany and frigid Russia. But nature has fixed it in ideal surroundings, in the great silent rivers of Africa.

It takes a fill of crops and destroys half a field in marching to and fro while feeding, but that enormous gulping mouth has done good service, from ages long ago, for unheeding man. In order that hippo appetites may be satisfied great watercourses have been kept open.

The hippos have cropped the rivers of their too abundant vegetation, and in so doing have maintained streams in their beds when otherwise they would have overflowed and drowned many a fair area where now man can live and plant and sow and reap his own harvest.

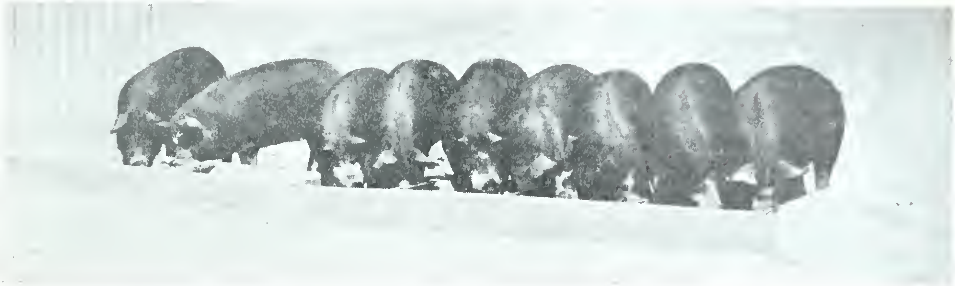
A SPLENDID RACE THAT IS DOOMED WITH THE PASSING OF THE JUNGLE

The hippos are a doomed race. Civilization is bound to destroy them in its stride. Gardens will grow where they now tramp by night; steamers will ply where they now revel and hide by day. They will disappear from Africa as they disappeared from Europe.

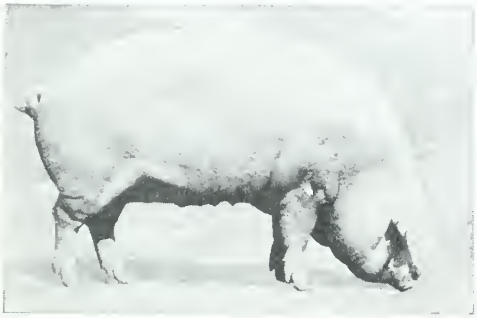
But will future generations forgive the destruction of this great creature, this wonderful, bizarre creation? The determination of man to utilize for his own needs every foot of tillable soil will surely result in disaster for the hippo, for when economic demand is set against the life of any mammal that mammal is doomed.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 1825.

SOME IMPORTANT BREEDS OF HOGS

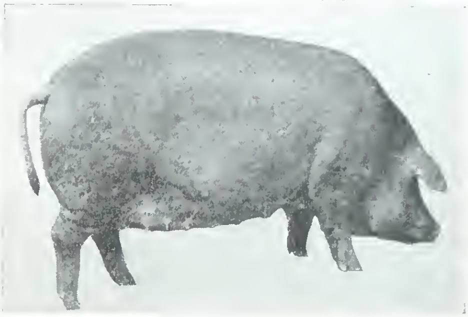


This litter of nine Berkshire pigs weighed 2,190 pounds when this picture was made, and contains some fine specimens. Photo, courtesy Jenkins Bros.



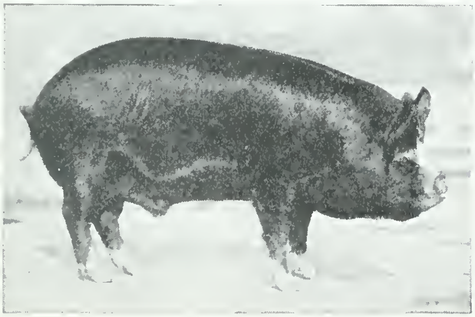
Photo, courtesy Moore Brothers Co.

Chester White Sow.



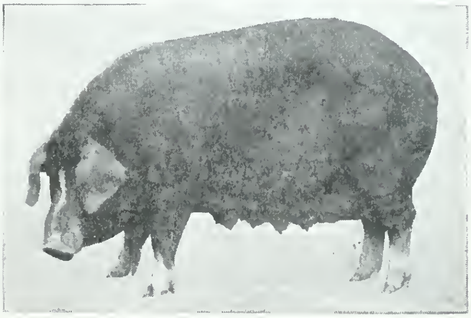
Photo, R. F. Hildebrand.

Duroc-Jersey Sow.



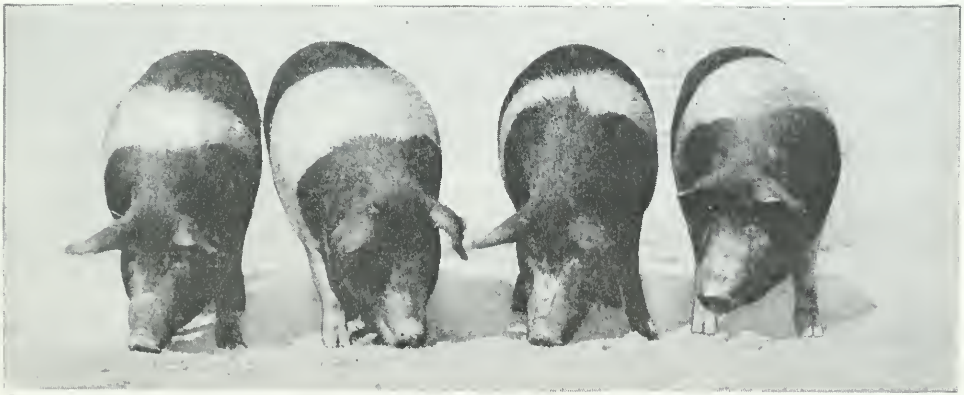
Photo, Live Stock Co.

Grand Champion Berkshire Barrow.



Photo, R. F. Hildebrand.

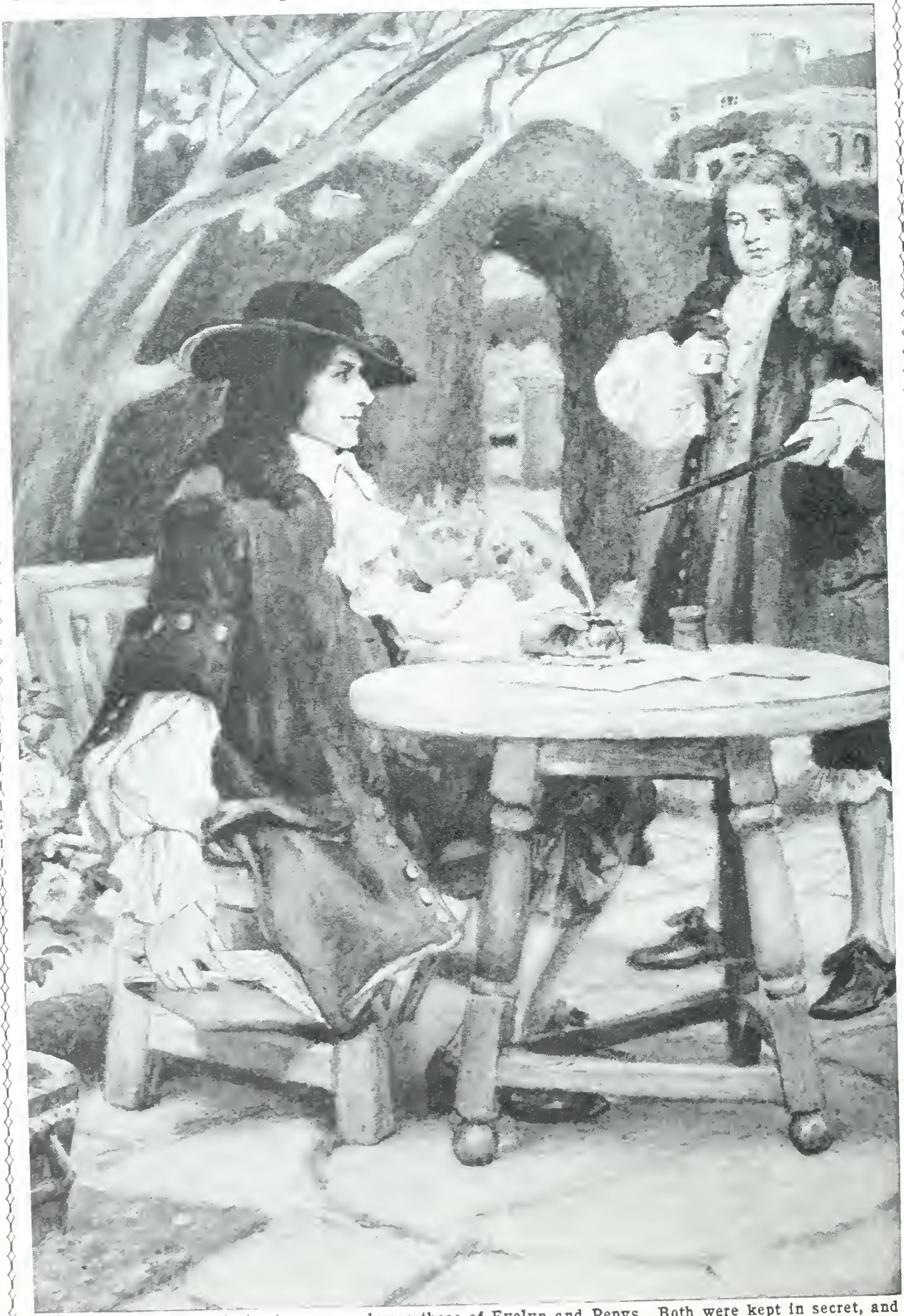
Grand Champion Poland-China Sow.



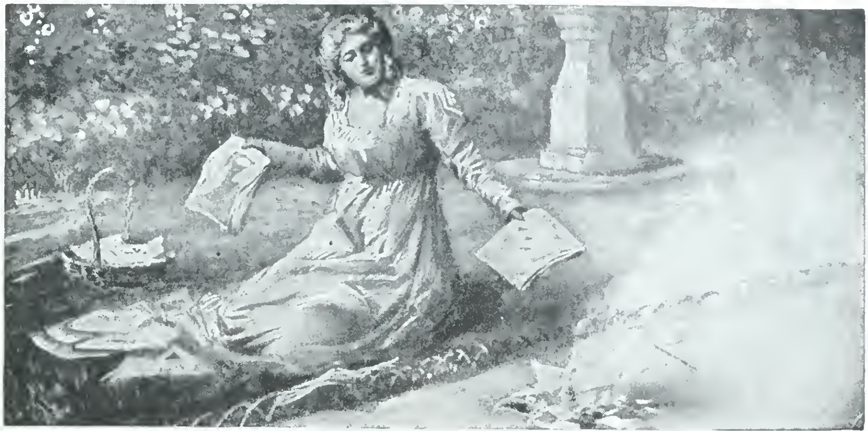
Photo, courtesy The Hampshire Swine Record Association.

Prize-winning herd of Hampshires at the National Swine Show. This herd was bred and raised in Iowa.

PEPYS FINDS JOHN EVELYN AT HIS DIARY



The two most famous diaries in our annals are those of Evelyn and Pepys. Both were kept in secret, and their existence remained unknown to the world for a century after the deaths of their writers.



Fanny Burney destroying the manuscripts of her early stories.

THE DIARY-WRITERS

WE might suppose that many people who lead interesting lives would care to write about them, and leave daily private diaries or journals of importance to history of literature. To write candidly of events while they are fresh in mind and haste neither hurries the writing nor wipes out our impressions, does not seem difficult, and to a number of people must be inviting. Some of these writers would be certain to have a gift for writing, and so we might expect to find the diary an attractive feature of the world of books. Yet the truth is, that very few diaries have won a permanent place in English literature.

If we try to name ten such books, we must halt halfway in doubt, for a diary that will remain interesting to the general reader is rare. Strictly speaking, it should be intensely personal, telling how the writer sees the world with his own eyes day by day, and so clearly revealing his character that we soon know the man who is writing, and can make allowance for his feelings. The personality of the diary-writer must be attractive, or his diary is bound to be dull. A mere record of events is useless. It can be found at any time in the newspapers. In the diary that lives as literature we must see men and events through the eyes of the person who describes them and can arrest our attention by his choice of the things he observes.

A diary, too, should have breadth of outlook if it is to make a general appeal to men in after-ages. Specialism, or dwelling on one thing, may be very useful but its appeal is narrow. Thus the diaries of George Fox the Quaker, and of John Wesley, deal only with religious subjects. They are admirable of their kind, but it is not the widest kind. Still more narrow are diaries like Jonathan Swift's Journal to Stella, a special kind of love letters. Some nineteenth-century diaries, intended from the first for publication, are specialist work.

The diary of the nineteenth century that came nearest to being a lasting book is that kept by Henry Crabb Robinson. "Old Crabb" wrote 102 manuscript volumes of diaries, journals and reminiscences, which have been inadequately sifted and presented to the public. He was a fairly successful lawyer, the first newspaper war correspondent (in Spain), an editor of The Times, and a popular social figure. Some day his diary will be edited so completely and well that it will have a fair chance of join-re the select few that are an unqualified success.

Those few are the diaries of Samuel Pepys, John Evelyn and Fanny Burney (Madame D'Arblay). We must not omit to mention James Boswell, whose Life of Doctor Johnson had many of the best features of an ideal diary, chiefly because it was a record of personal observation made at the first possible opportunity; but Boswell's work is much more than a diary.

THE IMMORTAL DIARY THAT SAMUEL PEPYS WROTE IN SHORTHAND

Undoubtedly the first place among English diarists is taken by Samuel Pepys. For nine years and five months, from January 1, 1660, to May 31, 1669, he wrote in a secret shorthand exactly what he had been seeing and doing day by day. As he lived in London, in an official position, at a very interesting period, and was in touch with many matters of public importance, his picture of the times in which he lived and of how people were acting and thinking is invaluable.

But the diary is much more than a collection of information we are glad to have from a singularly shrewd observer. No book in the world is more original and quaint. Pepys wrote solely for his own pleasure. He never supposed that any eye but his own would see the diary, and in it frankness was carried to its utmost limits, especially frankness in confession. Nothing in the life of Samuel Pepys was hidden from his diary. Ambitions, vanities, imperfections, vices are all there, and they are set down with a quaintness that is not matched in all our literature. What Pepys does not do in his diary is to give us a clear understanding of his own ability as a man of business. As a matter of fact, he was one of the ablest men and steadiest workers in England at a period when slackness was common, and he was accepted among men of real distinction as one of themselves.

THE TAILOR'S SON WHO BECAME AN IMPORTANT MAN OF AFFAIRS

Pepys was the son of a London tailor, but he had family associations with Sir Edward Montagu, afterward Earl of Sandwich, who was steadily his patron, and whom he always wrote of in his diary as "My Lord." After being educated at St. Paul's School and Cambridge, Pepys became a clerk, first in the Exchequer Office and later in the Admiralty, where he was no doubt advanced by his kinsman, the Earl of Sandwich, who was in command of the fleet which brought back Charles II from exile.

Pepys began his diary in his twenty-seventh year. He prefaces it by saying that, though he is esteemed rich, really he is very poor. Through the ten years' course of the journal we watch his growing prosperity and learn every detail of it. He died a rich man. On the day of his death, May 26, 1703, John Evelyn, his fellow-diarist, a gentleman of the first order, who knew him well, wrote:

> This day died Mr. Samuel Pepys, a very worthy, industrious, curious person, none in England exceeding him in knowledge of the navy, in which he passed through all the most considerable offices, Clerk of the Acts and Secretary of the Admiralty, all which he performed with great integrity. He was universally beloved, hospitable, generous, learned in many things, skilled in music, a very great cherisher of learned men of whom he had the conversation.

PEPYS' GRAPHIC ACCOUNT OF AN ANXIOUS DAY IN PARLIAMENT

It may be added that twice Pepys was Master of Trinity House, twice a Member of Parliament, once Master of the Clothworkers' Company, and for two years President of the Royal Society. Anyone who did not know these facts might fail to understand him correctly from reading his diary. We must remember it was written when he was still quite young, that it was purely personal, and that, though much of it is trivial, the task of writing it was a monument of industry. No other man has ever written anything of the kind of such general interest.

The most striking passage in the Diary that shows the true Pepys as a man of mettle, is his description of how he appeared at the bar of the House of Commons to defend the Admiralty staff from charges made against them. His superior officers were inclined to give in. Not so Pepys. Though he is disgusted with the whole business, he believes he can make good its defense, and he does so.

On March 3, 1668, he writes in his diary:

> Up betimes to work again, and then met at the office, where to our great business of this answer to Parliament; where to my great vexation I find my Lord Brouncker prepared only to excuse himself, while I that have least reason to trouble myself, am preparing with great pains to defend them all.

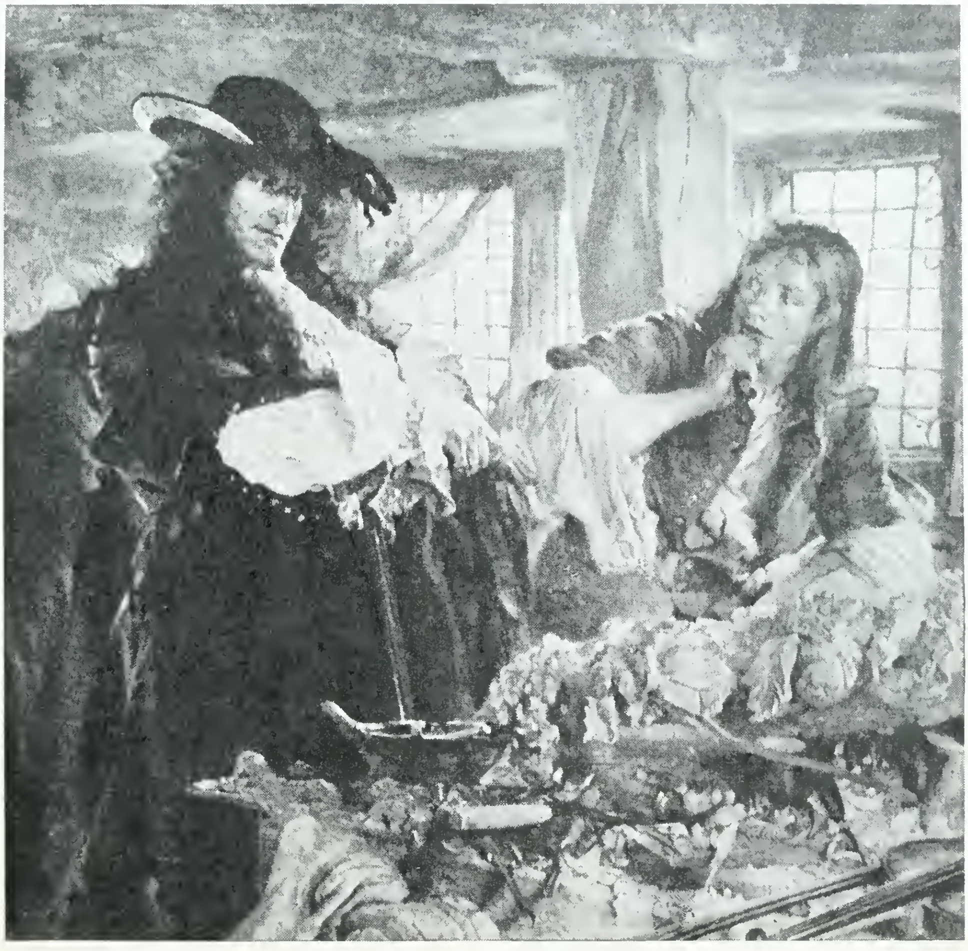
Then two days later we have these

entries, full of natural feeling, sound description and honest pride:

With these thoughts I lay troubling myself till six o'clock, restless, and at last getting my wife to talk to me to comfort me, which she at last did, and made me resolve to quit my hands of the office, and endure the trouble of it no longer than till I can clear myself of it.

So with great trouble, yet with some ease from this discourse with my wife, I up and to my office, whither come my clerks, and so I did huddle the best I could some more notes for my discourse today, and by nine o'clock was ready, and did go down to the Old Swan, and there by boat to Westminster, where I found myself come time enough, and my brethren all ready.

But I full of thoughts and trouble touching the issue of this day; and to comfort myself, did go to the Dog, and drink half a pint of mulled sack, and in the Hall (Westminster) did drink a dram of brandy at Mrs. Hewlett's; and with the warmth of this did find myself in better order as to courage, truly. So we all up to the lobby; and between eleven or twelve o'clock were called in, with the mace before us, into the House where a mighty full House; and we stood at the bar, namely Brouncker, Sir J. Minnes, Sir T. Harvey, and myself, W. Pen being in the House, as a member. I perceive the whole House was full of expectation of our defence what it would be, and with great prejudice.



John Evelyn discovers the young wood-carver Grinling Gibbons, and sets him on the road to fame.
From the painting by Edgar Bundy.

After the Speaker had told us the dissatisfaction of the House, and read the Report of the Committee, I began our defence most acceptably and smoothly, I continued at it without any hesitation or loss, but with full scope, and all my reason free about me, as if it had been at my own table, from that time till past three in the afternoon; and so ended, without any interruption from the Speaker; but we withdrew. And there all my fellow-officers, and all the world that was within hearing, did congratulate me, and cry up my speech as the best thing they ever heard; and my fellow-officers overjoyed in it.

John Evelyn, the other great diarist of the seventeenth century, was in many ways unlike Samuel Pepys. He was the finest type of cultured English country gentleman, and quite out of harmony in his inmost nature with the immorality of the Restoration period. Yet he was a Royalist. Even Pepys, very much a man of the time, shook a doubtful head over the doings at Charles II's court, and Evelyn was grieved to the heart, for he was a man of genuine and unaffected piety. Much of the interest of Evelyn's Diary is in the mysterious way in which he managed to be what he was as a public man and politician while he was such an ideal man privately. It was not that Evelyn acted wrongly in public affairs, but he supported steadily men who were quite unlike himself.

THE LOFTY MIND OF JOHN EVELYN REFLECTED IN HIS DIARY

Evelyn's sympathy with Pepys was partly because they were both interested in science. He was one of the founders of the Royal Society, and later was its secretary. In forestry Evelyn was the most widely known expert in the country. As a patron of art he noted the excellence of the wood-carving of Grinling Gibbons and introduced him to the notice of Charles II. His Diary has not the racy gossip that flowed naturally from the pen of Pepys. It is grave and earnest; but as we read on, it impresses us more and more, and we feel that through it we are living in another age and that our companion is a man of the rarest moral quality. It extends from 1640 to 1706. As an example of his style the description of the Great Fire of London may be quoted.

> The conflagration was so universal, and the people so astonished, that, from the beginning, I know not by what despondency, or fate, they hardly stirred to quench it; so that there was nothing heard, or seen, but crying out and lamentation, running about like distracted creatures, without at all attempting to save even their goods; such a strange consternation there was upon them, so as it burned both in breadth and length, the churches, public halls, Exchange, hospitals, monuments, and ornaments; leaping after a prodigious manner, from house to house, and street to street, at great distances one from the other.
>
> For the heat, with a long set of fair and warm weather, had even ignited the air, and prepared the materials to conceive the fire, which devoured, after an incredible manner, houses, furniture, and everything.
>
> The noise and crackling and thunder of the impetuous flames, the shrieking of women and children, the hurry of people, the fall of towers, and houses, and churches, was like a hideous storm; and the air all about so hot and inflamed, that at the last one was not able to approach it, so that they were forced to stand still, and let the flames burn on, which they did, for near two miles in length, and one in breadth.

A WOMAN'S BRIGHT PICTURE OF DOCTOR JOHNSON'S TIMES

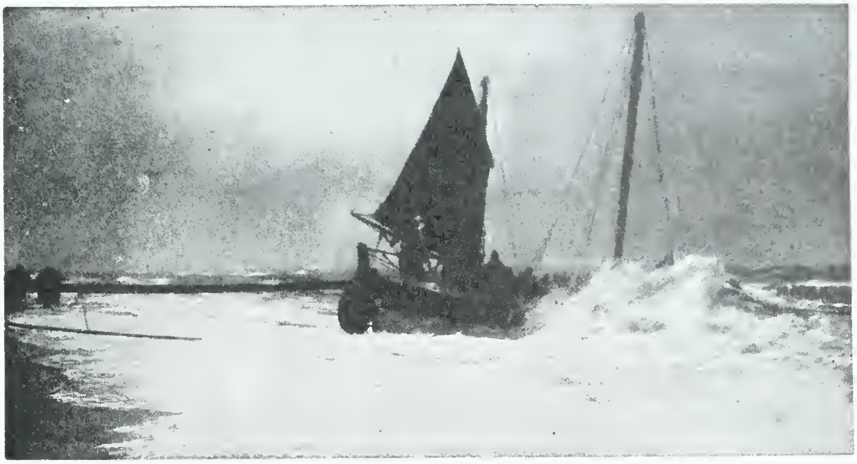
The lady who made her name as Fanny Burney by writing novels which charmed her contemporaries, and who later became a poor imitator of the worst features of Doctor Johnson's prose, kept a diary for many years, in a loose sort of way. After her death, in 1840, at the age of eighty-seven, the Diary was published at great length, mixed up with letters to and from the writer's friends.

The story of Miss Burney is best told in connection with her novels, as she is most justly remembered for these. But in the earlier parts of her diary, before she was influenced by Johnson, it is brightly descriptive of scenes and people surrounding Johnson as a centre. Indeed, from her fifteenth year Fanny lived in the midst of an exceptionally brilliant social circle, gathered round her father in his London home. Garrick was a constant visitor and many of the chief musicians, actors and authors of the day. Later, when she accepted a humble office near the person of George III's stupid queen, the diary includes descriptions of court life and prominent politicians. When the strain of court life told on her health, she retired into private life.

THE LONG TIME THAT PASSES BEFORE A DIARY SEES LIGHT

Her Diary was the only one published near the life of its writer, but Madame D'Arblay's age removed her so far from the time when her diary mattered that it could be published almost at once without restraint. Evelyn's Diary was published 112 years after its writer's death; and Pepys' Diary saw the light 156 years after it was finished, having been deciphered three years earlier, in 1822. It seems, therefore, to be a rule, and a good rule, that diaries, which are almost sure to be personal, shall wait before they are revealed.

THE NEXT STORY OF LITERATURE IS ON PAGE 1867.



A RACE FOR THE LIFEBOAT

A LITTLE girl named Margaret, who was born and bred in a fishing village on the Scottish coast, was sleeping alone with her mother one summer night.

While the dark hours wore away, the wind rose, and the waves grew big and tossed their manes as they came dashing to the shore. The mothers and sisters in the fisher cottages woke and started at the sound. They knew that it meant danger to their dear ones away in the fishing-boats. Morning dawned, and they went and stood on the shore straining their eyes in search of sails. While they waited there in trouble and fear, they saw, to their dismay, a ship heaving up and down on the waves, drifting nearer and nearer to the sharp rocks.

The little crowd of women, children and feeble old men on the beach stretched out their hands helplessly toward the men in the rigging. There was not a boat left on the shore, all the strong men and boys were away fishing, the lifeboat station was four miles away, and there was none among the helpless group who could launch a boat in such a sea. Yet it was heart-breaking to watch men perish before their eyes.

"If only the lifeboat men could know!" a woman cried. Little Margaret heard her, and a bright thought came to her. Eagerly she asked if the ship could hold together while she ran for the lifeboat. Someone shouted that she would not be able to cross the stream, but Margaret was off. Four miles, and that flooded burn lay before her! It raged like an animal; and the small plank bridge had been carried away.

Into the water Margaret plunged. It nearly carried her off her feet, and she gasped and shuddered as it chilled her through and through. Then rallying all her strength she forced her little body against the current and inch by inch pressed on. And so the worst was over, and she was out of the stream.

When at last the tottering feet of this brave little maid reached the village street, she had just strength to cry out that there was a ship on the rocks before she lost consciousness. But she had done her work. Kind hands cared for her. Meanwhile the crew of the lifeboat quickly took their places, launched the boat, and hastened to the scene of the wreck.

Margaret's deed was not in vain, for the lifeboat was in time to rescue the crew of the ship on the rocks.

THE FRIEND OF THE SLAVES

ABOUT three hundred years ago, at a time when the ships of those days ventured out of port in hourly dread of attack by sea-robbers, a French vessel coasting along the Gulf of Lions was seized by three African pirate corsairs. They killed the captain, and the crew and the passengers, including a young priest, Vincent de Paul, were chained and shut up in the hold.

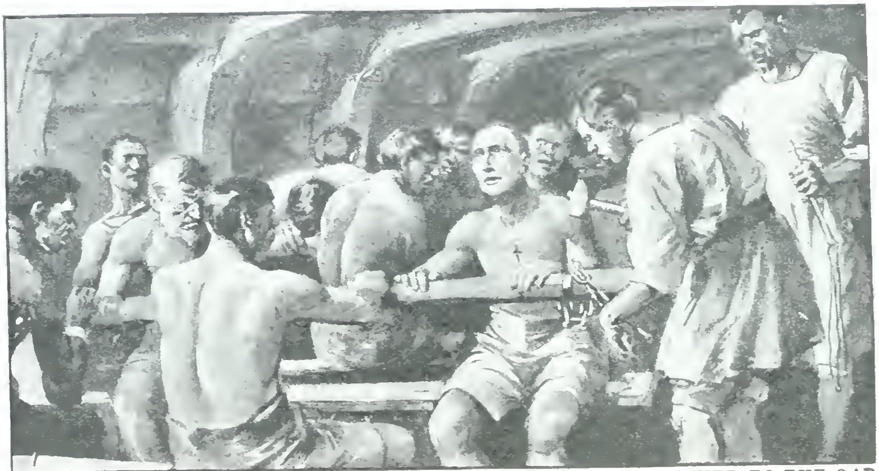
The prisoners were cruelly treated, though many of them were suffering from wounds received in defending the vessel. Being landed at the port of Tunis, they were sold as slaves in the market place. The young priest did all he could to encourage his fellow-prisoners. He was sold to a fisherman, and then to a Moorish physician, who took a liking to the clever youth and promised him freedom and a life of ease and honor if he would turn Mohammedan. But Vincent de Paul replied that he preferred slavery to giving up the Christian religion. Soon after that his master died, and he was sold again to a native of Venice who had not withstood the same temptation to renounce his religion.

Now, Vincent de Paul did the work of a field laborer on his master's farm. He talked to his master's wife; and when she discovered through him what a true and beautiful religion her husband had given up she was grieved, and persuaded him to become a Christian again.

That was a dangerous thing for him to do in a Moorish country, so the master and his slave escaped alone in a small boat to Europe.

Vincent de Paul's life was full of change, and he seems to have done kindnesses to numbers of the people he met. He visited and comforted the sick in a Paris hospital, and at one time acted as tutor in the family of Count de Joigni, who had to inspect the convict ships or galleys, as they were called, in the harbors.

The poor priest knew what it was to be a slave, and his heart was stirred to pity by the sufferings of the miserable convicts. He could not rest till he had gained permission from King Louis XIII to do what he could to help them and to give them alms. So he became the king's almoner.



VINCENT DE PAUL, TAKING THE PLACE OF A PRISONER, IS CHAINED TO THE OAR

In visiting a gang of convicts at Marseilles one day, he found a broken-down man in chains, despairing because of the hardships his wife and children were enduring while he was unable to care for them. Many convicts were unjustly punished for quite slight offenses, and ought to have been free. It is possible that this man ought to have been at liberty; at any rate, Vincent de Paul thought so; for, unable to bear the sight of the convict's misery, he made up his mind to do a very noble and unselfish act—to change places with the man. He knew the jailer, and got permission to take the convict's place.

And so the chains were removed, as

we see in the picture on page 1732, and put on the priest, who took his place in the gang of men. But he suffered so much from the rough life, hard work, association with criminals and cruel pressure of his chains, that though he was soon released, he felt the after-effects all his life.

Aided by his friend the count, he won back the prisoners to hope and self-respect, and both worked hard to improve the prisons and galleys. Vincent de Paul devoted his life and his possessions to the service of the oppressed. He collected money, and with it bought and freed 1,200 slaves. He started the Order of Sisters of Charity who do so much good in France, visiting the sick and taking care of helpless children and aged people. He influenced for good the king and queen of France. He got the king to persuade the Dey of Tunis to let him establish a mission for the Christian slaves of the Moors in North Africa. The Brothers of St. Lazarus, as the missionaries were called, arrived there in the midst of a plague, and nursed and helped both Christians and Moors.

It was many, many years before the English and French fleets succeeded in doing away with piracy in the Mediterranean; but it was largely owing to the interest in the matter roused by Vincent de Paul that the traffic in slaves was finally stopped.

THE APPRENTICE BOY AND HIS MASTER'S CHILDREN

At the time when boys were apprenticed to a tradesman to learn a business or craft, a boy was learning to be a gunsmith in a port in the west of England. He was a boy whom his master trusted, for one day he left him to take care of the house and the four little children while he and his wife went to visit a village near by.

While the boy was busy serving customers, the children were playing together in the room behind the shop. All went well until, after one man had stayed chatting some time, the apprentice thought the childish voices had been quiet a long while. He listened but heard only a far-away murmur.

Then he grew rather anxious, wondering where the children could be. After he had called them several times, there came an answer, which made him run to the top of a ladder leading down to the cellar under the shop. When he shouted down the ladder, the little ones told him with glee that they were playing shop, and had lighted a candle.

That might have been a harmless game; but when the apprentice heard what was going on he was filled with horror, for down in that cellar gunpowder was stored. As fast as he could the boy hurried down into the cellar, and there he found his fears confirmed. The dangerous powder was doing duty for tea and sugar, and being put into pieces of paper, just as the packages were made in the grocer's shop.

But that was not by any means the worst of the play. The children had found a piece of candle-end and pushed the cover of the barrel of gunpowder half off, and had placed the lighted candle-end upon it.

At any moment they might all be blown up. Here was opportunity for the display of presence of mind and great courage, for there was no time to be lost.

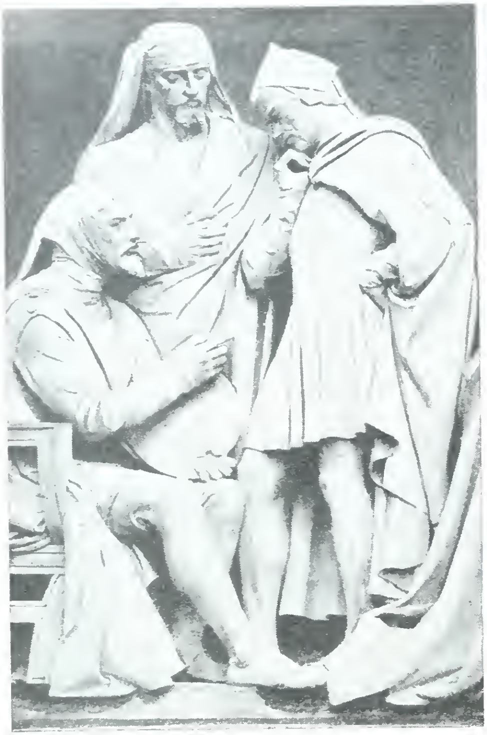
"Run and see if father and mother are coming!" cried the boy. "Make haste!"

He said just the right thing. The children loved their parents, and they were obedient. If they had not obeyed instantly, but had stopped to finish measuring out that dreadful sugar and tea, they would have been killed, for the candle was flaring down near its end. But they rose from the ground, clambered up the ladder, and ran out into the street, looking for their father and mother.

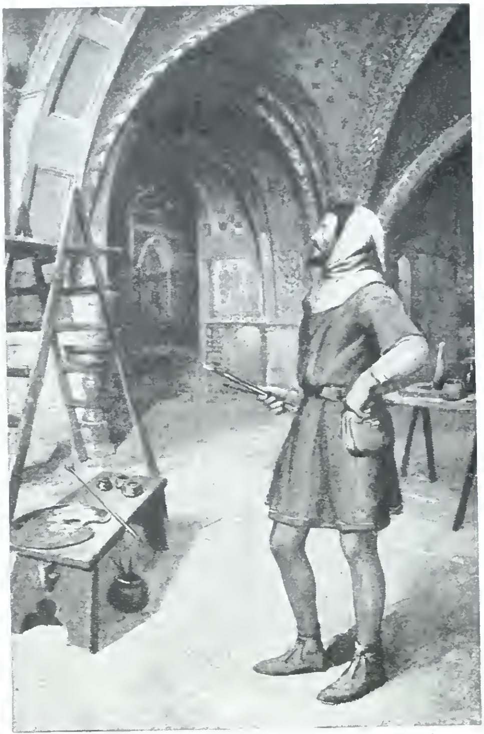
The brave boy down below, protecting the candle-flame with his hands, listened intently till the patter of the little feet overhead had ceased. Then, with the greatest care, he lifted the sputtering candle-end, and though it burned his fingers, he carried it very slowly, very carefully to the foot of the ladder, and climbed into safety. His remarkable coolness and presence of mind had prevented a terrible calamity. Four little children had been saved from frightful death and their parents spared a great sorrow.

THE NEXT STORY OF GOLDEN DEEDS IS ON PAGE 2007.

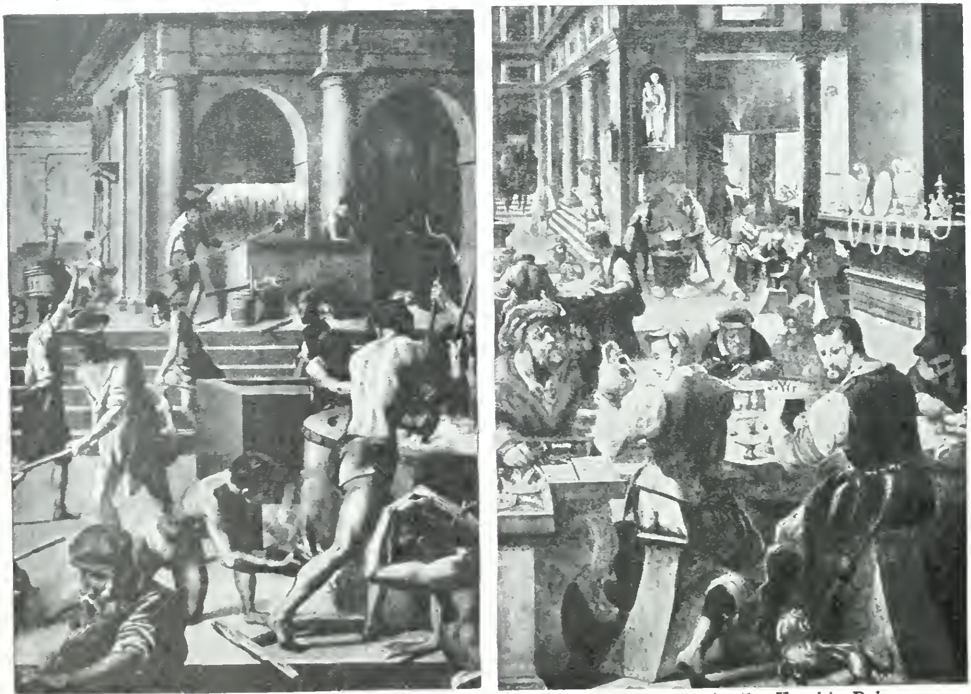
SCENES IN THE GREAT DAYS OF FLORENCE



Cimabue talks things over with Giotto.

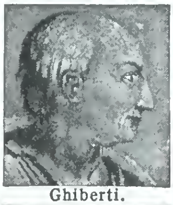


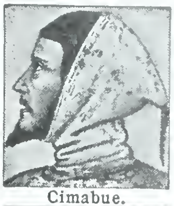
Cimabue decorating the walls of a church.

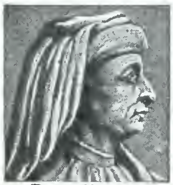


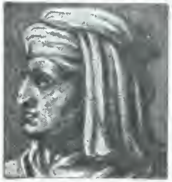
Scenes in the working life of Florence in its great days—from pictures in the Vecchio Palace.

Donatello.


Ghiberti.


Cimabue.


Brunelleschi.


Della Robbia.

Giotto.

THE BUILDERS OF FLORENCE

DONATELLO'S ST GEORGE

AMONG the many cities of Europe that we desire to visit, none calls to us more clearly than the ancient city of Florence, which lies in the lovely valley of the Arno. An old legend says that it was built by Julius Cæsar, who called it Fiorenza, and though learned men say that this is only a pretty tale, we know that the city was founded by the Romans.

If you should walk about in Florence you might wonder why there are so many statues of David there. In three places you would see Michelangelo's gigantic figure of the shepherd lad and his sling—the original marble statue, in the Academy, for protection from the weather; a marble copy, in front of the Palazzo Vecchio (Old Palace), where the original first stood; and a bronze copy, in the Piazzale Michelangelo on the hill overlooking the city. And other smaller statues of the young hero who slew the giant Goliath are given honored positions. To the Florentines, who spent many years under tyrants and who gave their blood freely in the fight for freedom, David, champion of liberty, seems a symbol of their city.

Italian cities commenced the struggle against feudal rule early in the Middle Ages, and some of them became powerful states. Florence was not among the first to rise; but in the twelfth century her citizens had become so strong that they were able to ruin the strong places of the nobles and compel them to live within the walls. After that the city was time and time again convulsed by party strife; for the nobles, who were banded into a faction called the Ghibellines, tried to impose their will upon the citizens, who were called the Guelphs. But at last the power of the nobles was broken.

Florence under a government headed by the leaders of the great citizens' guilds became noted throughout Europe. Representatives of the guilds were sent to every capital; and in the days of its early glory, two hundred years and more before Columbus was born, the city was the home of great artists and learned men. In spite of many misfortunes Florence was enormously wealthy, and it was natural that men who loved their city, who had fought for it, and whose fathers had died for it, should turn their attention to making it beautiful.

We marvel at the beauty they have

to us, and it adds to our amazement to remember that when she was made beautiful Florence was already centuries old. The wonderful thing is that the city found that she had ready the men capable of carrying out, in the best possible way, the high ideals from which the search for beauty grew. They were architects and sculptors whose works have seldom been excelled in the history of the world. Many of them sprang from such humble circumstances that we do not know their early history.

HOW ARNOLFO BEGAN THE GREAT WORK OF MAKING FLORENCE BEAUTIFUL

One of these men of humble birth is Arnolfo di Cambio. We meet him first in the company of a band of workmen who were engaged with him at work in the Cathedral of Siena. He was still a young man, having been born about 1232. With him was a man named Lapo, whom he sometimes called his father and sometimes called his teacher. All these workmen were skillful artists, going from town to town in Italy, beautifying existing buildings or putting up new ones. It was Arnolfo that Florence chose to begin her great work of beautifying the city. The young workman became suddenly renowned as an architect and sculptor, and while similar tasks were being attempted in the neighboring cities he went swiftly to work to give Florence some of the buildings which to this day help to make her famous.

He was the father of her architecture. He surrounded the city with stately walls, he built her noble cathedral and two of her most beautiful churches, and he planned the famous public palace of the city, where the governors of Florence held their meetings. But Arnolfo could not finish all the great works that he began. He died in 1300, leaving much for those who followed to complete.

HOW CIMABUE FOUND GIOTTO MINDING SHEEP AND HELPED HIM TO FAME

In Italy at this time the art of painting was given almost no attention. Church-decorations were done in mosaic or were painted by foreign artists who followed Byzantine models. Only one or two Italian artists had begun to paint in a different way, copying or imitating the works of old Roman artists. In 1240 there was born at Florence, Giovanni Cimabue, who became a worker in mosaics and perhaps a painter, too, although we are not sure now that he made the pictures which for many years were thought to be his. His name was held in high honor in Florence, and there is a famous old story which tells of his finding and training an artist greater than himself, Giotto di Bondone. He it was who turned to a new, a more independent way, representing nature as it appeared to him.

Giotto was born in, or about, 1266, the son of a peasant at Vespignano, near Florence. While he was still a little boy Giotto was placed by his father with some shepherds to watch his flocks. Giotto may have been a loving shepherd, but he loved art better. Without having had a lesson, he used to give all his leisure to drawing on the rocks with chalk. It is said that while he was thus engaged one day making a drawing of a sheep Cimabue found him. The great artist, pleased at the boy's industry and talent, asked if he would like to go with him and learn to paint. Permission having been gained from the boy's father, Giotto was taken to Florence and instructed by his good friend. Giotto proved a ready pupil.

GIOTTO, THE LAUGHING ARTIST WHO TALKED MERRILY WITH A KING

And now there came about a great change in the methods of artists. Pattern-making became of less importance than the expression of life and nature. Giotto was really the first to paint in this way. He was about twenty-four when he gained his first important commission—to paint a picture of Paradise over a church altar. An interesting thing happened in connection with this. Dante, the great poet of Florence, was then living in his native city, and had shown himself a friend of the young artist. So, as Giotto sat perched high up on his little platform near the roof of the church he thought of what he owed the poet, and showed his gratitude by painting a beautiful portrait of Dante among the angel faces of his picture. That portrait is the finest of the great poet that we have, for it was painted before sorrow and care had marred the noble features of Dante.

Giotto's talent was speedily recognized. He was paid to do paintings for the famous church in which St. Francis of Assisi is buried; for churches at Rome, Padua, Verona, Naples and elsewhere, and, of course, for many in Florence. Wherever he went he was always the simple laughing peasant turned artist. He had a merry jest for everybody, whether it was king or clown. Said a king who employed him: "I wouldn't work upon that scaffold this hot day if I were you." "Nor would I if I were you," answered the laughing artist.

HOW GIOTTO MADE A PLAN FOR THE POPE AND WENT TO ROME

On another day he and a great lawyer were caught in a storm, and as they went their way, drenched and plastered with mud, the lawyer turned to Giotto, and noting how comical he looked, said: "Do you think that anybody seeing you at this moment for the first time would believe that you are the greatest painter in the world?"

"Yes," said Giotto, "if he could believe that you knew your A B C."

Another joke of Giotto's is told at the expense of the pope. The latter sent a great man round to all the cities to collect specimens of the work of the artists, saying that the painter whose work he liked best should go to the Vatican to carry out a great scheme of decoration. The other artists were anxious to show the best thing they had done; but Giotto was not at all concerned. He took up his brush, dipped it in red, then drew with it a circle, so perfect that it looked as if it had been drawn with compasses. "Here is the drawing," he said, handing it to the envoy.

"Am I to have nothing but this?" gasped the man.

"That is enough, and too much," answered Giotto. "Send it with the others, and see if it is understood."

Apparently it was understood, for it is said that the pope sent for him, and that he painted some pictures in St. Peter's at Rome.

THE BEAUTIFUL TOWER OF GIOTTO IN THE STREETS OF FLORENCE

When he was an old man, only two years before his death, Giotto was made master of the public works of Florence, and given charge of the building of the cathedral left incomplete, as we have seen, by the death of Arnolfo, about thirty years before. Not only had Giotto now to superintend the work of others: he had to create, with measuring instrument, with hammer and chisel, as he had been wont to create with his paints and brushes. He was called upon to design a campanile—a tower in which to hang bells. He did the work with as light a heart as if it were an everyday occurrence. He planned and designed one of the most beautiful towers ever built. It is one of the marvels and beauties of Florence to-day, and visitors from far lands carry away with them the lovely memory of it. Not only did Giotto plan it: he worked with mallet and chisel at some of the carvings which adorn it. One of the carvings represents a little puppy—a puppy, it is said, which he had loved as a child when minding the sheep, and had remembered years and years afterward, when he was one of the most famous men in Italy.

The beloved Giotto passed to his rest in 1337, and from that time on, for a number of years, the work of making Florence beautiful was in the hands of artists of skill, but less famous than those whom we are considering. We take up our story again when we find in Florence three other wonderful men. These are Filippo Brunelleschi, born about 1379; Lorenzo Ghiberti, born in 1378; and Donato di Betto Bardi, called Donatello, born about 1386.

THE GATES FOR WHICH ALL ITALY'S ARTISTS MADE PLANS

The first two came into prominence when Ghiberti was about twenty-four, and then met as friendly rivals. Ghiberti was of poor family. We know little about his father, but we hear of his stepfather, an excellent man named Bartoluccio, a goldsmith, who instructed young Ghiberti in his own art, and then did a wise thing in sending the lad to travel and enlarge his knowledge of art, and at the same time to earn his living.

Ghiberti was a wonderful fellow. When he was not painting pictures he was modeling in wax, or making figures in bronze, or doing something with trinkets. Before he turned his face homeward, he had earned fame by painting some fine frescoes in a palace at Rimini. He was working at Pesaro when he got a letter from his anxious stepfather telling him that all the most skillful artists in Italy were summoned to show their genius in designing gates of bronze for the famous Church of San Giovanni, the church to which all the children of Florence were then, as now, taken to be baptized. Here was Ghiberti's chance. He needed not his stepfather's bidding to hasten home; so anxious was he to reach

Florence that the journey seemed to him, as he said, like a thousand years. He made his model and sent it in to take its place with the designs of the most famous men of the time.

THE GREAT CHANCE OF GHIBERTI'S LIFE AND THE USE HE MADE OF IT

Among the other competitors was young Filippo Brunelleschi. He was a lawyer's son, and his father had desired him to follow the law. But Filippo early gave his heart to the work of the goldsmith, and dearly he hoped now to win the prize. When the models were exhibited he took with him his humble young friend Donatello. They examined the designs, and saw that Brunelleschi's was better than all except that of Ghiberti, which was superior to all the rest. And so the judges found. Ghiberti was ordered to undertake the work; this young wandering workman of twenty-four was chosen before all the other artists who competed.

Ghiberti had started now upon the work of his life. To understand what he had undertaken we must examine the picture of his gates, on page 1741, or, better still, if we cannot go to Florence, we may see a cast of them in the Corcoran Museum in Washington or in the Metropolitan Museum in New York. This is his second pair of gates, on which he spent nearly thirty years. The first pair took twenty years. Thus fifty years of his career were given to the work. But while Ghiberti was doing the gates with the assistance of a staff of artist-workmen he was engaged in other labors, too. He did some beautiful work for two or three churches of Florence, as well as for the cathedral; he modeled fine statues, and did some beautiful goldsmith's work.

THE GATES THAT MICHELANGELO SAID WERE FIT TO BE THE GATES OF HEAVEN

Ghiberti was even given part share with Brunelleschi in the building work at the cathedral, but here as a builder he was a failure. Brunelleschi could not work with him and had to refuse to go on unless Ghiberti were kept to work of his own kind; and even when they were able to give him his own work, Ghiberti was found to be incompetent, and was removed. His grandest monument is the second pair of gates, which for mingled grace and grandeur are finer than anything else of the sort in existence. Michelangelo declared that they were fit to be the gates of heaven. Ghiberti loved the work, and he gave the best of his life to it. Though its progress was so slow, all the most exalted people in Florence were interested in it. In those days Florence was an unlighted city at night, save for the torches which people carried, and everybody not specially authorized had to be indoors by dark. But Ghiberti, though no higher in rank than the rest of the common people, became an important public character when he began the gates, and he and all his workpeople were allowed to walk about the streets at night and to carry lanterns at whatever hour of the night they liked—a rare privilege indeed in those days.

It was well for Filippo Brunelleschi that he did not get permission to make the gates, for there was other important work for him to do, even greater in some respects than Ghiberti's. Himself an ugly little man with a nature not of the kindest, he had a soul for beauty.

HOW BRUNELLESCHI BUILT THE DOME THAT IS STILL THE GLORY OF FLORENCE

Having yielded the palm to Ghiberti in the contest over the gates, he went off to Rome to indulge his passion for architectural drawing. He had already sketched every building in Florence, and he longed to make a new drawing showing how Arnolfo's grand cathedral could be completed by the addition of a dome. So at Rome he studied all the great old buildings. He made drawings of them; he noted how they were constructed, how beauty was combined with strength, and lightness with mass. In order that he might have money to live on, he would work during the day for the goldsmiths, then at night go on with the drawings of his beloved buildings. Never did a man more thoroughly train himself for a task than did young Filippo for the dome of the Florence cathedral, Santa Maria del Fiore.

At last, in 1407, when he was thirty years of age, he returned to Florence and offered to the city authorities plans for the building of a dome. It took the wise men of Florence thirteen years to come to a decision. In that time every sort of objection was raised, and everybody's opinion was taken. Other artists made designs, and the wildest of schemes were suggested for carrying out the work. But in the end Brunelleschi gained the day, and was told to carry out his plans.

The dome took over forty years to build, and Brunelleschi had been fifteen years in his grave when it was completed. But his plans were so perfect, his methods so excellent, and his personal labors during the last twenty-six years of his life so persistent, that the faithful band of workers who followed him had but to carry out to the end what he had begun, to make his work one of the grandest features in the architecture of Europe. He crowned with a dome of grace and splendor the majestic cathedral, which is usually called the Duomo, begun 150 years before the dome was finished. Measured across, the dome is still one of the biggest in the world, and its beauty remains unsurpassed. The Pitti Palace, too, a very noble and impressive building, was planned and begun by Brunelleschi, but finished by others after his death.

THE MERRY DONATELLO AND HIS WONDERFUL FIGURES IN STONE

So far we have met Donatello only by name. He was the young friend who went with Brunelleschi to see the models which had been submitted for the gates. He was one of the merriest fellows, and perhaps it was because of the youth's sunny nature that Brunelleschi, who was ten years older, became his friend and companion. Donatello was the son of a wool merchant, who apprenticed him to a man who is supposed to have been Ghiberti's stepfather. At any rate, the boy learned, like Brunelleschi, the goldsmith's art, and going to Rome with his friend, was able to support himself there by his skill in working in metals.

While Brunelleschi was studying the classic architecture of Rome, Donatello was studying the statuary. He had not his friend's capacity for great schemes and buildings, but he had just as fine a genius, and though he laughed and joked his way through life, he was destined to become one of Italy's greatest sculptors, looked upon as the father of modern sculpture.

Donatello was very young when he did his first work for Florence—statues to be placed in niches on the outside walls of the cathedral (the Duomo) and another church called Or San Michele. Each figure that he made marked some change leading in the direction of naturalism. The position was less stiff, the feet placed more naturally, the face given more expression. The finest of these early works was the vigorous young Christian warrior St. George, made for Or San Michele, but now in the National Museum, London.

DONATELLO'S STATUES FOR GIOTTO'S TOWER, & HIS FIGURE OF ST. GEORGE

Donatello was one of the sculptors engaged upon the decoration of Giotto's noble tower. He carved for it several statues, among them a lifelike figure called Zuccone; and as he gazed upon his finished work he took up his mallet, and, giving the statue a playful tap, said to it: "Speak!" Michelangelo, who was not born until nine years after the death of Donatello, greatly admired Donatello's statues. Once, when he was looking at the wonderful figure of St. George, clad in mail, looking as if ready to step down from its pedestal and do battle against wrongdoing and evil, he remembered what Donatello had said to Zuccone, and he himself now shouted: "March!" Could there be a finer compliment to a great sculptor's work?

All Donatello's statues are famous. They are beautiful in themselves, but they are important because of the effect they have had upon later sculpture. Their creator had closely studied the glorious work of the ancients, and he reproduced their methods, stamped with his own genius. Until his day men had been content to let the statues they carved be part of the building to which they belonged, as a cornice or a scroll is part of a building. Donatello made them actual portraits in stone, things of life and beauty, independent of their surroundings; figures whose merits command attention and admiration for themselves.

THE MODESTY OF DONATELLO, AND HIS FEELING ABOUT MONEY

From his thinking so highly of his work that he bade one of his statues speak, it might be thought, perhaps, that Donatello was a vain man. But he was not. When people praised him highly for his work in Padua he said that he must return to Florence. "If I stay here, where I am praised by everybody," he said, "I shall soon forget all I know. At home in Florence everybody abuses me, and thus I am kept up to the mark, the constant blame forcing me constantly to study and, consequently, to do better work."

He had a joke and a kind word for everybody who deserved them, but once when a niggardly man complained that the sum charged by Donatello for a great [illegible] amounted to twenty-five cents a day for a month, the sculptor took his hammer and smashed his work to pieces. It was not that he cared anything about money. All that he earned he used to put in a basket and hang up in his workshop, so that his friends and workmen could help themselves without troubling to ask him. He lived through a happy old age, and died when he was eighty.

LUCA DELLA ROBBIA CARRIES ON THE WORK OF BEAUTIFYING FLORENCE

The next man of genius to carry on the work of making Florence beautiful was the great sculptor Luca della Robbia. He was born in Florence about 1400, and for about a century he and his successors, known everywhere as the Della Robbias, were famous in the art-world of Italy. They belonged peculiarly to Florence, living in a house which Luca had bought. Like many other sculptors, Luca began his career in a goldsmith's shop. There he learned to model in wax, and passed from that stage to shaping objects in bronze and marble.

His first important work for Florence was the carving of a beautiful gallery in the cathedral to face the singing gallery sculptured a few years earlier by Donatello. Luca carved a happy band of singing and dancing figures along the marble gallery. The rollicking boys are so merry and free that when we look at them we forget they are in marble and listen for the music coming from their lips; we can almost hear their bare feet tap lightly like leaves in the wood as they pass along. It is not easy to decide which are the more lovable, Donatello's little cherubs or Luca's singers; but, as we look from one to the other, if we go to see them where they are now—in the Cathedral Museum—we shall probably agree that on the whole Luca's are more harmonious.

A CLEVER FAMILY AND THE WORK BY WHICH THEY ARE REMEMBERED

His next work was on Giotto's Campanile. Here he was commissioned by Florence to finish a series of reliefs which had been begun by Giotto and Andrea Pisano. He was a quick sculptor and finished these five panels in one year. The next year he set to work on two altars for the cathedral. One piece of work upon which Luca spent part of his time for over twenty years was the production of bronze doors for one of the sacristies of the cathedral. Donatello had been given the order first, but he was too much occupied in doing other things to get started upon the work; so Luca was the one who finally made these doors.

But the kind of work which we think of as peculiarly belonging to the Della Robbias is not in marble or bronze but in glazed terra-cotta. Statues or figures in relief were first modeled in the clay composition. After they had been tinted in soft, beautiful colors they were covered with a glaze, or kind of enamel, and fired. The same kind of enamel had been used in Persia two hundred years before, but Luca did not know that, and he was happy and proud when his new process of glazing terra-cotta proved so successful.

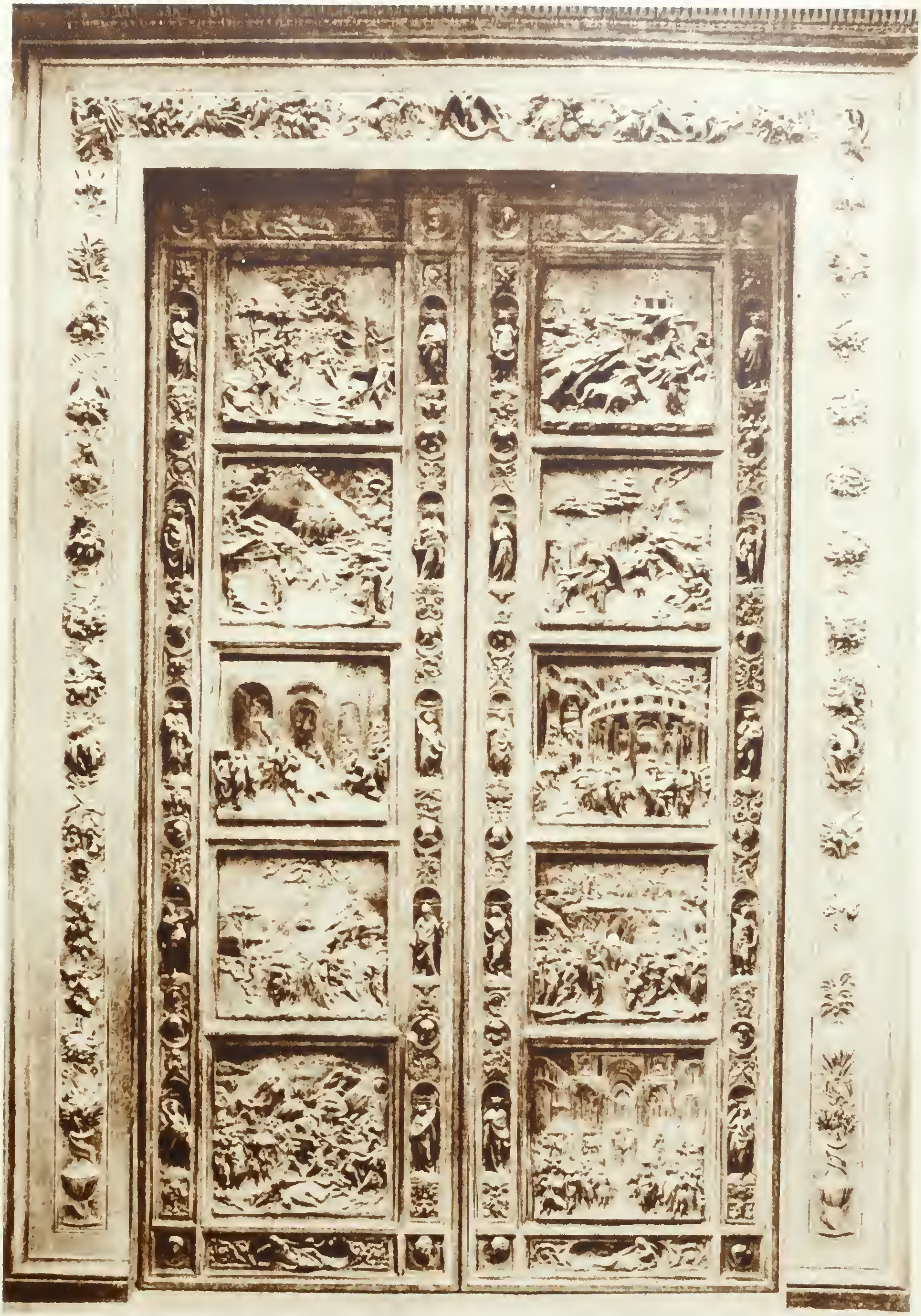
OTHER GREAT NAMES WHICH BELONG TO THE STORY OF FLORENCE

He took his nephew Andrea into his service to work at this terra-cotta; and Andrea had seven sons, five of whom became artists in the same workshops. Of these Giovanni was, after Luca and Andrea, the most famous of the talented family. Two of the seven sons became monks, in order to follow Savonarola. These two sons of Andrea were probably drawn into the company of Fra Bartolommeo, who, born in 1475, became one of the most renowned of Florentine artists. He worked at the monastery of San Marco, where had painted, too, Fra Angelico, another famous artist-monk, of whom more is told on page 698.

Afterward there came to Florence the great Raphael, of whom we read on page 959. He was eight years younger than Bartolommeo, but he was able to teach Bartolommeo, and the monk was able to teach him. We shall find Michelangelo's extraordinary life in the story of the makers of Rome and in the story of the Fine Arts, but Florence was his native city. He was born there in 1475, and carried out there some of his finest work. His David, "the Giant," as we have seen, Florence adopted for her own silent champion. Out of a long, slender block of marble, whose awkward proportions were the despair of other sculptors, Michelangelo had summoned this tall, frowning youth with his sling—a figure of energetic protest against tyrants. And in 1504, on the terrace of the Signory palace (Palazzo Vecchio), a site chosen by a council of artists, the statue was set up.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 1859.

GLIMPSES OF FAIR FLORENCE



GHIBERTI'S NOBLE BRONZE GATES FOR THE BAPTISTERY, WITH OLD TESTAMENT SCENES

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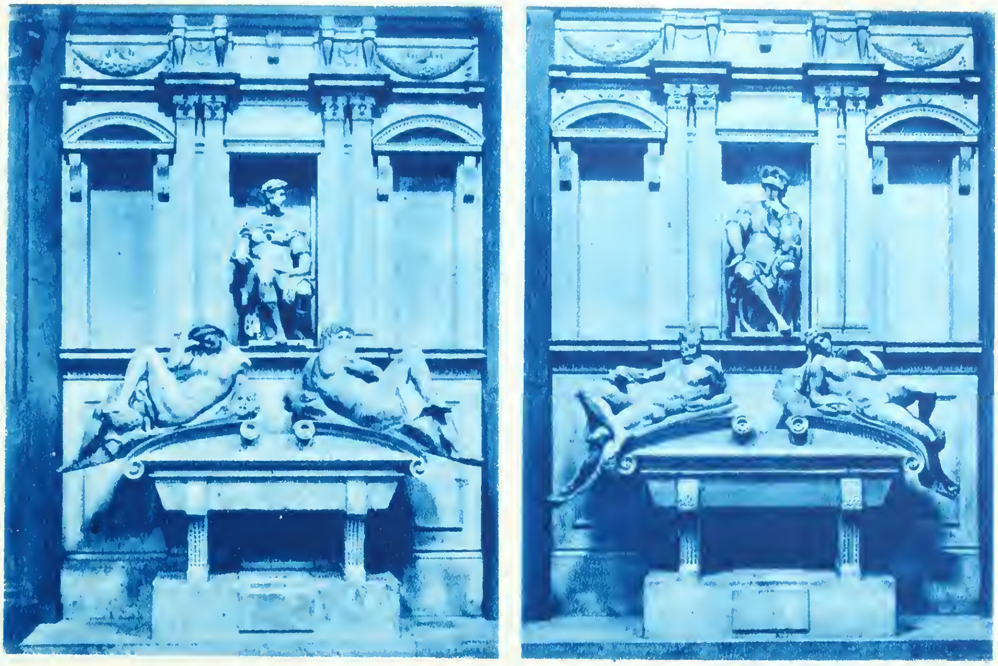
A FOUNTAIN IN A GARDEN NEAR FLORENCE

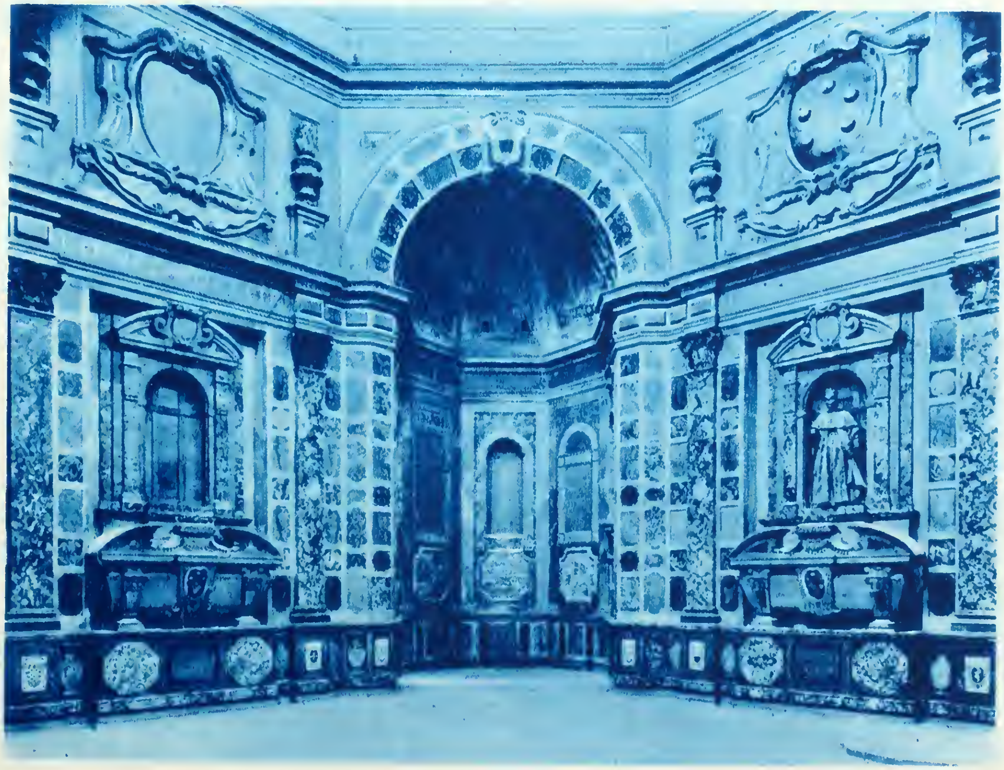
MICHELANGELO'S DAVID, IN BRONZE LOOKS DOWN ON FLORENCE

A MARBLE COPY OF THE DAVID

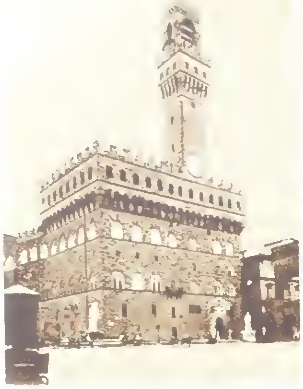
A STATUE OF HERCULES AND CACUS



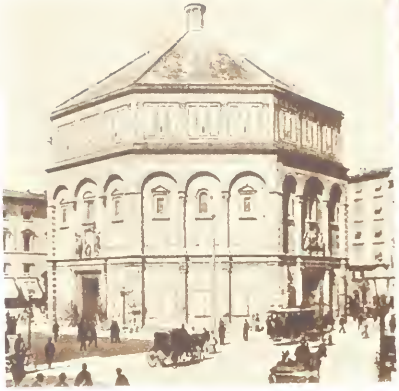
THE FAMOUS FIGURES BY MICHELANGELO ON THE MEDICI TOMBS



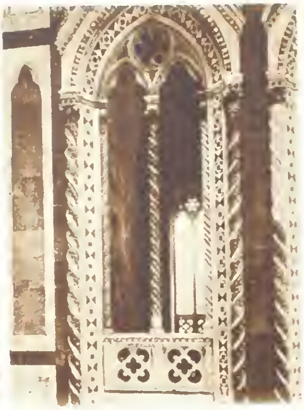
THE INTERIOR OF THE MEDICI CHAPEL



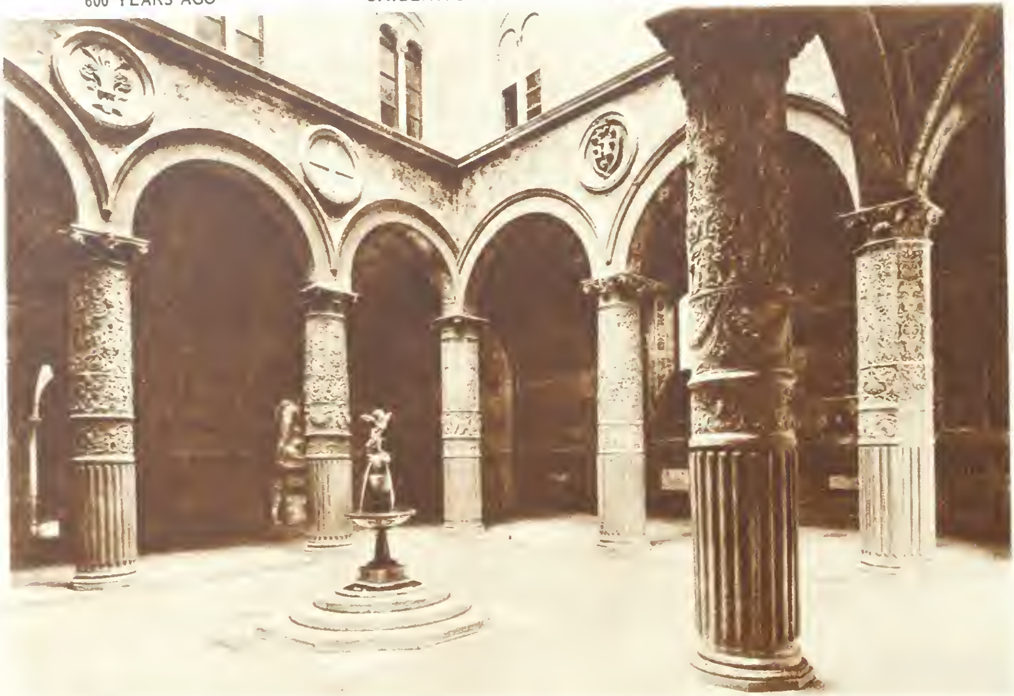
THE VECCHIO PALACE, BUILT 600 YEARS AGO



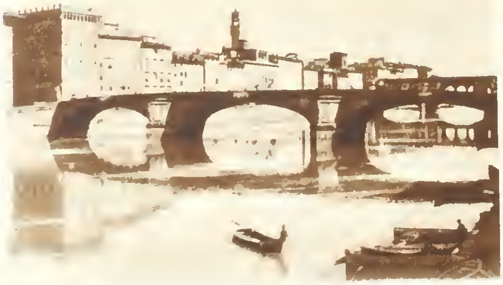
THE BAPTISTERY FOR WHICH GHIBERTI'S GATES WERE MADE



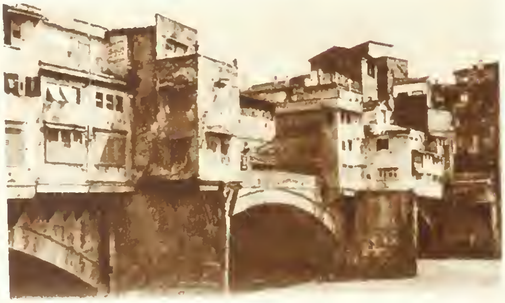
A WINDOW IN GIOTTO'S TOWER



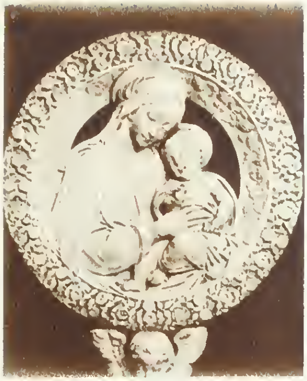
THE PILLARS OF THE COURTYARD OF THE VECCHIO PALACE

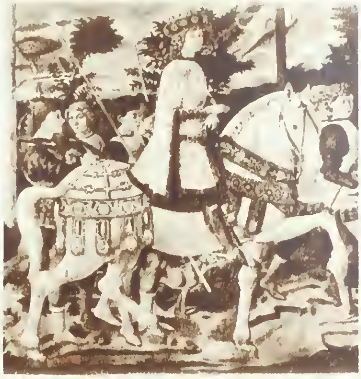


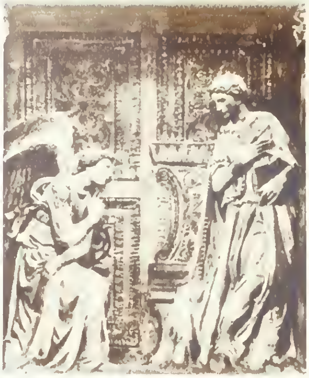
A BRIDGE ACROSS THE ARNO, LINKING THE TWO PARTS OF FLORENCE



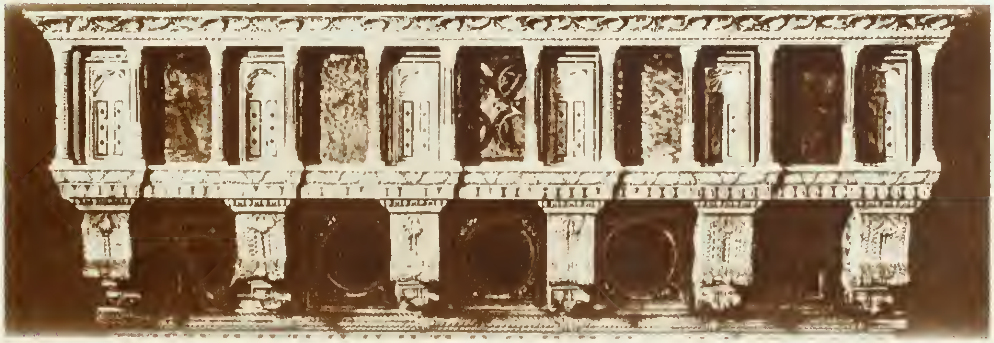
PONTE VECCHIO, THE OLDEST BRIDGE IN FLORENCE


MADONNA AND CHILD, BY BENEDETTO MAJANO, IN SANTA MARIA NOVELLA


LORENZO DE MEDICI AS ONE OF THE MAGI, BY BENOZZO GOZZOLI, IN THE RICCARDI PALACE


DONATELLO'S SCULPTURE OF THE ANNUNCIATION, IN SANTA CROCE

THE WALLS OF THE FAMOUS SPANISH CHAPEL IN THE CLOISTERS OF SANTA MARIA NOVELLA


THE SINGING GALLERY BY DONATELLO, IN THE CHURCH OF SAN LORENZO

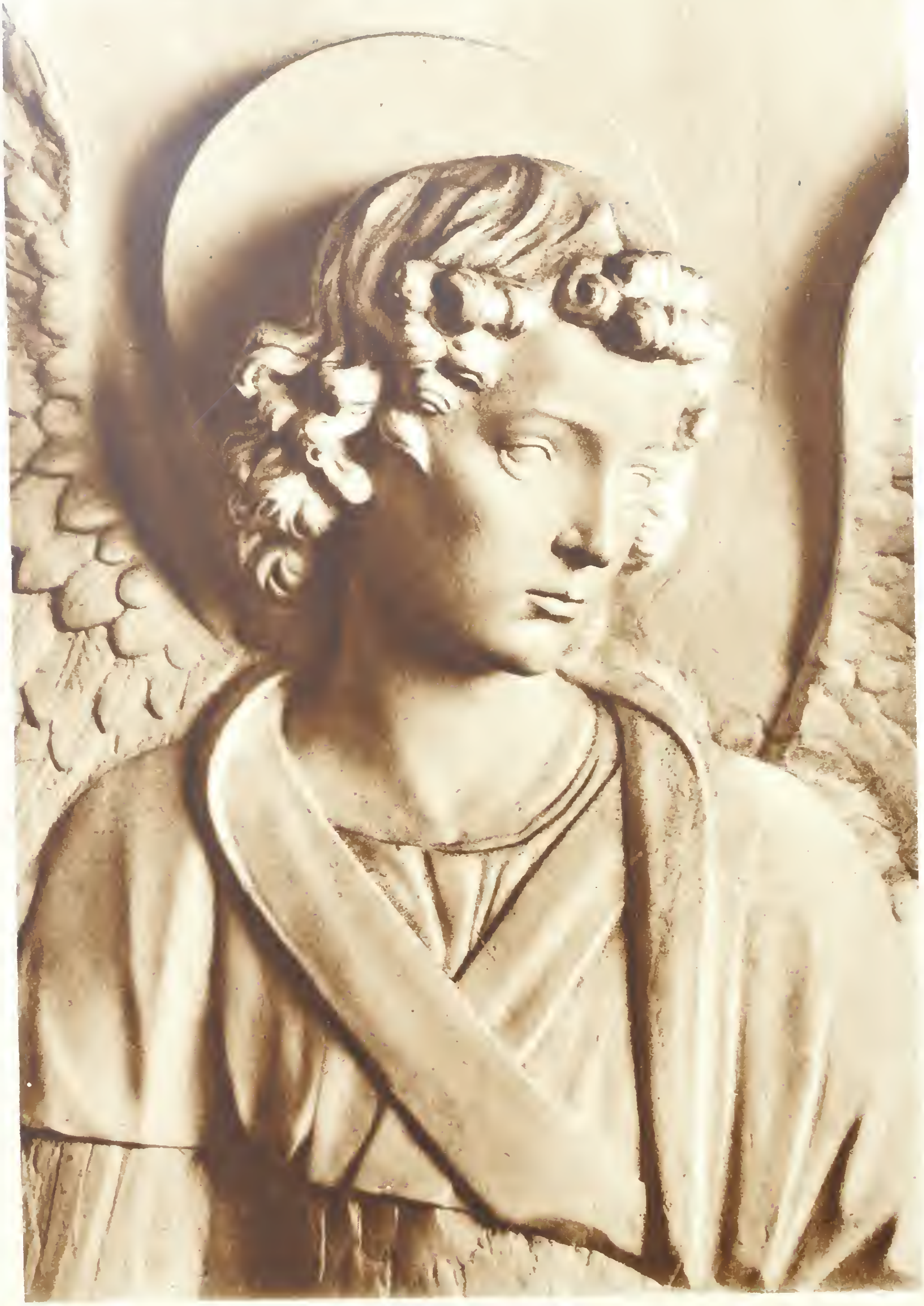
FLORENCE FROM A GARDEN ON THE HILL

GIOTTO'S TOWER AND BRUNELLESCHI'S DOME

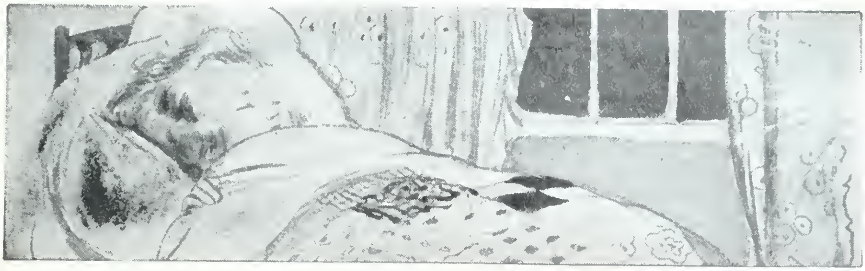
THE TOWER OF THE VECCHIO PALACE

THE ROOFS OF FLORENCE, WITH SANTA CROCE ON THE RIGHT

BRUNELLESCHI'S DOME TOWERING ABOVE THE RED ROOFS OF FLORENCE



AN ANGEL, BY LUCA DELLA ROBBIA, ON THE WALL OF A LITTLE CHAPEL IN THE CHURCH OF SANTA CROCE



WHERE AM I IN MY SLEEP?

NO one is quite sure why we go to sleep at all, but probably the real reason is that while we are awake we make something in our bodies which the blood carries to the brain, so as to put it to sleep, just as medicine will put you to sleep; and the best kind of sleeping draft is the kind that is most like the stuff we make in our own bodies for this purpose.

If you ask what good we get by sleep, the answer is that we go to sleep so as to rest. The whole body rests when asleep, more or less—the brain, the heart, the lungs, the muscles, stomach, and all. Children need a lot of sleep because they have to grow, and they do most of their growing during sleep; so that if they will not go to bed they will not grow properly. Sleep is more important for children than for anyone else, though no one can get on without it. Many of the people that grow up too small or weak, or poor in their minds, are people who did not sleep enough when they were children and had not finished growing.

Now, as to where we go in our sleep. That is a question indeed—a question that baffles the wisest man. But we may be sure that, as far as actually "going" is concerned, we remain where we were when we slipped off into unconsciousness. We are still there, only we are not awake. We are not awake to what is around us; but though we take no notice of what is around us, we are still there; and even while we are fast asleep we are often doing all sorts of things, or, rather, we think we are, which is not quite the same thing. This is so every time we have a dream, and we have far more dreams than we remember when we wake. Long ago savages used to think that men merely went away somewhere when they slept, and dreaming was one of the reasons that made them think so; but that was a mistake. Dreams do people all sorts of harm if they believe in them, think too much about them and are not sensible about them.

So slight a thing as the wind in the chimney or a leaf tapping on the window-pane may make us dream; but the commonest thing that disturbs us is our stomach. If we eat too much before we go to sleep, especially if we eat things that do not agree with us, then in the night they disturb the brain and make part of it wake up, though not so much as to make us know where we are. Noises also often make us dream because they disturb the brain. But sounds could not disturb the brain if we were not still there to hear them, so that a dream, if we think of it, shows us that we certainly do not "go away," but remain where we were when we went to sleep.

The only sense in which we "go away" is the sense in which the phrase "not all there" is sometimes used. We say a man is "not all there" when his mind is befogged. The mind of man sleeping is certainly still in his body; but it is not all there in the sense that not all its faculties are working.

WHY DO METALS LET LIGHT THROUGH WHEN BEATEN THIN?

It is quite natural that metals should behave as they do; nor are metals at all peculiar in this respect. Light is believed to consist of waves in the ether, and the ether is everywhere. But where matter is present too, as, for instance, the matter of the air or a sheet of glass, or a piece of metal, the passage of light is in some degree interfered with. The most perfectly transparent thing we know will yet stop some light. This is true, for instance, of glass; even the best glass used for the lenses of spectacles. It is true of clean country air, as we discover when we climb a high mountain and find how bright the sunlight becomes when it has to pass through a thinner layer of air on its way to us.

If the matter has this effect on light, the thicker the layer of matter, the greater the effect will be; and this, of course, is true of metals, as of every kind of matter. The only difference is that metals offer a particular resistance to the passage of light, and so, if they are to let light through, they must be beaten out very thin; until, indeed, they become semi-transparent.

WHEN WE SING A NOTE TO THE PIANO, WHY DOES IT ANSWER?

If we put down the loud pedal of a pianoforte (so raising the dampers), and then sing a steady note, we find that the piano also begins to sing. There is a very interesting reason why. We hear sounds because of blows on the drums of our ears. These eardrums are membranes stretched across the ear passage as parchment is stretched across a drum. If anything beats on this drum, the vibrations of the membrane are communicated to the brain and we hear sound.

Irregular vibrations of the air cause us to hear sounds we call noises, as, for example, when we knock over a chair. If the air is made to move in regular waves by regular vibrations, we hear a pleasing sound which we call a musical note. Thus, when a bow is drawn by an experienced hand across the fiddle-string, the string vibrates regularly, and the air is set into a regular wave-motion. This wave-motion reaches our ears and causes the drums to vibrate accordingly. So it is with the piano-string, which is set vibrating by being hit with a felt-covered hammer when we strike the appropriate key.

Musical notes are high or low because of length of the sound-wave set up in the air, and in the case of stringed instruments the size of the wave and the consequent height, or pitch, of sound depends on the length of the string. Whether we hit the same string hard or soft, it will give out only one and the same note, which varies with its length.

When we sing into the piano, we set up waves of sound in the air, and the particular strings of the piano which are of a length to correspond with the note we sing begins to vibrate, and therefore to give out sound. But only the notes we sing will answer us. All the others remain silent, because their wave-length is not the wave-length we have set up. It is exactly the same principle that is used in wireless telegraphy, but in that case the waves are not sound-waves or air-waves, but electric waves in the ether.

HOW CAN WE TELL A STAR FROM A PLANET?

A star is a burning body like our sun, which looks so much bigger than the other stars merely because it is nearer to us. The name "planet" we give to the bodies which, like the earth, revolve round our own particular star, the sun. There are only a few of them.

In the heavens at night the sky is full of stars, and the planets shine among them. They do not shine, however, because they burn like the sun and the stars, but *because they reflect the light of the sun.* They are really very small bodies when compared with the sun or the other stars. Yet some of the planets make a fine show in the sky, and the little one we call Venus often looks bigger than the real stars. That is because it is much closer to us, and looks big compared with the distant stars, as the tip of our finger looks big when held up and compared with a distant mountain peak.

How, then, can we readily tell which of the stars are real stars and which are the dark lighted-up bodies revolving with us round the sun which we call planets? The answer is that the planets shine with a steady, unwavering light, whereas the real stars seem to twinkle. We never see the body of a star as we see the body of a planet. The stars, although so enormous, are so far away that the human mind cannot grasp half their distance, and they appear to us merely as twinkling points of light.

WHY HAS A TIGER STRIPES ON HIS COAT?

The tiger's coat is a wonderful example of what we call protective coloring in nature. The stripes of the tiger's coat serve a very useful purpose for the tiger. They mingle in perfect harmony with the grasses and stems of the jungle, so that when the tiger is bent upon his prey he is not easily detected by his victims. So his colors protect him in the struggle to live.

The scientist explains that such protective markings and colorings were developed in living creatures because those individuals which survived were best suited to their surroundings, and these lived to have young ones like them. So we find the arctic fox white, just as we find the tiger or leopard striped or spotted on a yellowish ground. To this powerful process of natural selection, the term *survival of the fittest* has been given; the fittest animals survive. The tiger's stripes fit him for hunting, and successful hunting enables him to keep his cubs alive and healthy.

WHY DOES HEAT MAKE THINGS SEEM TO QUIVER?

When a hot current of air passes between an object and our eyes, the object appears to quiver. It is only an appearance, however, and the phenomenon is one out of many illustrations of the fact that the eyes are easily deceived.

What really happens is this. It is not the heat that produces the appearance of quivering, but the effect of the heat on the air, and on the moisture in the air. The air, of course, is merely a mixture of gases, and gas, like other things, expands when it is heated, and so becomes lighter in density, as we say—the same bulk is lighter than before.

Light, when passing through a gas, travels in a straight line as long as the gas remains of the same density. As soon as the density changes, the light alters its course. Therefore, when hot currents come between an object and our eyes, the light coming from the object, and passing through the hot currents which are continually changing in density, is bent this way and that. So it comes about that the eye, instead of seeing the object stationary, as it really is, sees it wobbling because the light is made to wobble by the changing temperature of the air.

Scientific men term this bending of light, when it passes from one density to another, refraction. And this refraction plays a large part in matters of sight. It is by taking advantage of this peculiarity of light that we are able to make all sorts of valuable optical instruments, including magnifying-glasses, microscopes, telescopes, cameras, sextants, and so on. All these are based on refraction, or light-bending.

WHY DOES OIL BURN MORE EASILY THAN SOME OTHER THINGS?

The plain answer is, of course: Because oil contains the stuff that burns. Oil is a word covering many things, but though these things differ in many ways—in taste and color and smell, and in chemical composition—all oils consist of a very large amount of the two elements carbon and hydrogen.

Many oils contain a certain amount of oxygen, but no oils contain nearly enough oxygen to satisfy the carbon and hydrogen atoms in them. If hydrogen is to be fully burned, every two atoms of it need one of oxygen, as in water, which the chemists call H_2O. If carbon is to be fully burned, every atom of it needs two atoms of oxygen, as in carbon dioxid, which the chemists call CO_2.

No oil contains such a proportion of oxygen tc the carbon and hydrogen in it, and so all oils are capable of being burned—that is to say, of being made to combine with oxygen; and they will go on burning until all the carbon and hydrogen in them have combined with all the oxygen they are capable of combining with; and then, when the oil is completely oxidized, it is completely burned. Some oils burn more readily than others. This is because of the different proportions of the two elements which we have mentioned above.

WHY DO SOME PEOPLE GET HEADACHES BEFORE A THUNDERSTORM?

The reason is not known; but it is probably due to electric disturbances in the body caused by the electric condition of the atmosphere. Before the actual outbreak of a thunderstorm there are very heavy electric charges ready to be discharged between the clouds and the earth, and these naturally affect the body, and perhaps particularly the brain and nerves. Perhaps the effect is indirect, and not so much electrical as chemical. We know that in thundery weather milk turns sour more rapidly, and likewise there may be unfavorable changes in the chemistry of the body.

WHY HAS EVERY PAVEMENT A CURB OF GRANITE?

The business of a curb is to protect the pavement from damage through heavy vehicles bumping against it. The pavement itself is made of some such materials as cement, sandstone or limestone, which readily stand the wear and tear of foot passengers, but would soon be badly damaged if the wheels of carts and buses were allowed to rub against them. To prevent this all pavements are edged with curbs of the hardest granite, which will not crumble or split under the shocks of the traffic.

WHAT IS MEANT BY THE GREEK KALENDS?

There are none. In the Roman calendar the first day of each month was called the Kalends. From these the days of the previous month were reckoned backward to the Ides, which in most months corresponded to the thirteenth day of the month, though in March, May, July and October they fell on the fifteenth. Thus, when the soothsayer in Shakespeare's play warned Julius Cæsar to "beware the Ides of March," he meant that Cæsar should look out for danger on the fifteenth of that month. The ninth day before the Ides was called the Nones, which in all but four months was the fifth day of the month. In March, May, July and October, however, they fell on the seventh. As the first days of the months were called Kalends, it came about that a table showing the succession of months and all the days in each month of the current year is called a calendar.

The Greeks had nothing corresponding to the Roman Kalends, and so there arose a saying that when anything is indefinitely adjourned it is postponed to the Greek Kalends, meaning to a nonexistent date. To say that a debt would be paid on the Greek Kalends meant that it would never be paid.

WHY DO HOUSES SEEM CROOKED WHEN WE LOOK ACROSS A FIRE?

Light is always bent in some degree by the things through which it passes—as when it passes from a star through the air to our eyes, or when a stick seems to be bent in water. So far as light is concerned, the air is different according to its warmth. Warm air is less dense than cold air, and when light passes from one to the other, its path is more or less bent. When we look at houses through the hot gases that rise from a watch-fire, the light, as it travels from the houses to our eyes, is bent in passing from the cold air through the hot gases, and is bent a second time in passing from the hot gases through the cold air again.

As the fire does not give off the same quantity of gas at every moment, the light is bent in different ways, and not only do we see the houses crooked, but they seem to change their crookedness even while we are looking. This bending of the rays of light is called *refraction,* which simply means "breaking," and is very important in every way. Just as we see houses crooked when we look at them through the gases from a fire, so we see the stars crooked when we look at them through the air. The light from the stars is bent as it passes through the air. We do not see stars where they really are, but always a little distance from the real place, because of the refraction of their light before it reaches our eyes.

WHAT MAKES THE HEART BEAT?

It would take a big book to do justice to this question. We know positively that the heart can and does beat in an independent way, quite apart from the brain or the rest of the body. The heart of a frog or a bird or a rabbit, for instance, can be cut completely out of the body and will lie beating in the hand for a short time. This proves that what starts the heart-beat is in the heart, even though we know the brain can make the heart beat faster or slower, or can even stop it.

When we examine the heart of any animal, we find that it has a large number of nerve-cells. If we cut a heart to pieces any part which is cut away from the nerve-cells stops beating, but any part which has nerve-cells in it will go on beating until the heart dies from lack of food. If we attach tubes to the heart in place of the blood-vessels, and send fluids through it containing common salt and certain other salts which help to nourish it, it will continue to beat steadily for hours, or even days. In this way we can study the action of different things on the heart and it has thus been proved that sugar is a valuable heart food, while alcohol is no food to the heart at all.

HOW ARE THE MARKS PUT INTO WRITING PAPER?

If we hold a piece of writing paper up to the light we usually see a number of fine lines, words such as "laid," or "wove," and possibly some device such as a lion or a crown, which are almost transparent compared with the rest of the surface of the paper. Such markings are called watermarks. They are not printed on the paper with a sort of invisible ink, but are put on in the process of making the paper—part of the paper itself.

When the paper is being made, it passes through the machine as a flat web of pulp. When freed from most of its moisture, it passes under a roller known as a dandy roll. This roll is covered with wire gauze, and on the gauze is fastened the lettering or a design. The roll revolves over the surface of the wet stuff, and the pressure transfers the projecting design on to the paper, which thus becomes thinner where it comes into contact with the design. The mark is therefore printed on soft, half-made paper, exactly as words are printed on newspaper, but *without the ink.* Watermarks are a special feature of bank-notes and stamp paper, and are of great interest to collectors.

IS SMELL A WAVE IN THE AIR?

This is a deeply thoughtful question. Sound, as we know, is a wave in the air; and the heat we feel from the fire is a wave in the air; and light is a wave in the ether passing through the air. If, then, these waves explain seeing and feeling and hearing, why should they not also explain smell?

But the truth is that smell is not a wave in the air. The great point about smell and taste is that they are what are called *contact senses.* They are due to the actual *touching* of the tongue or part of the nose by particles of certain kinds. We cannot smell or taste at a distance. Of course, anyone will say that that is untrue about smell, but it is not. We seem to smell at a distance when we guess where the smell comes from; but the tiny parts of the thing that has the smell have actually traveled through the air and reached the nose. When we smell a rose, parts of the rose are given off and come in contact with the sensitive part of the nose with which we smell. The same thing is true of any unpleasant or disgusting thing which we say we smell.

HOW LONG DOES A SEA-ANEMONE LIVE?

It has long been known that sea-anemones live twenty or thirty years, but in 1921 men of science found proof that they live even longer than that. In that year an elderly Edinburgh lady invited members of the British association to her home and showed them sea-anemones she had kept alive in an aquarium for over sixty years.

At regular intervals during that time, the lady had driven from Edinburgh down to the sea with a number of quart bottles, and had hired a boatman to row out, far beyond where the water might be contaminated by land drainage, and fill the bottles there. Then she drove back home and replenished her aquarium with pure sea-water.

Once a month she bought the best meat she could procure and, mincing this up into tiny fragments, fed the anemones with it. The men of science were surprised to find that the creatures lived so long.

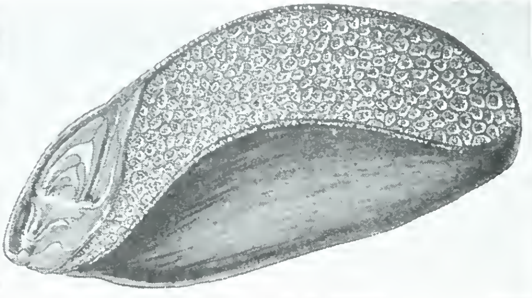
CAN A SEA-ANEMONE EAT A CREATURE BIGGER THAN ITSELF?

Sea-anemones are voracious feeders, and often attack creatures bigger than themselves. The anemone's life has been described as a continual ambush. A naturalist once gave a coin to a tiny anemone, which spread its mouth round the coin until its body became so distended that it was cut in two. But the anemone did not die. The two halves grew into two perfect anemones!

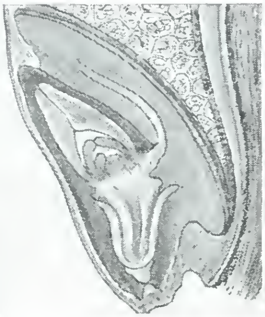
Even more curious was a case recorded by another naturalist. A dahlia wartlet anemone, which might originally have been two inches in diameter, had somehow contrived to swallow a pecten—an oyster-like bivalve the size of a saucer. The shell fixed within its stomach was so placed as to divide the anemone almost into two halves, so that the body became flattened like a pancake. All communication between the upper and lower portions of the body was cut off, but, instead of dying, the anemone used its misfortune as a means of increasing its enjoyment of life. While the upper half of the body drew nourishment through the original mouth, the lower half developed a new mouth with two rows of tentacles, and so the creature was able to feed at both ends. It became two distinct anemones, joined by a circle of skin.

THE NEXT WONDER QUESTIONS ARE ON PAGE 1807.

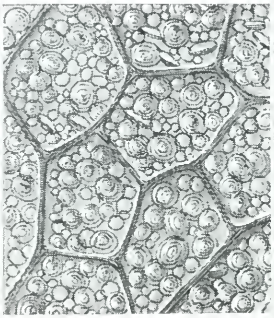
THE STORY OF A GRAIN OF WHEAT



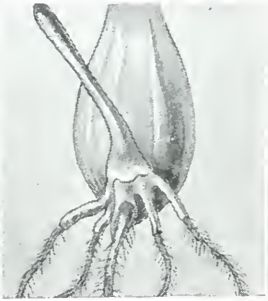
1. On the left is the embryo, in which the root and stem are packed. The rest of the grain, the endosperm, consists of food stored up to nourish the young plant.



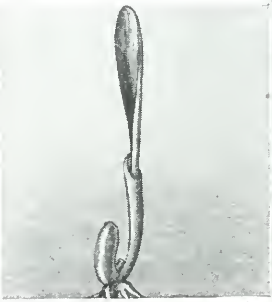
2. The embryo magnified still more, showing the root and stem.



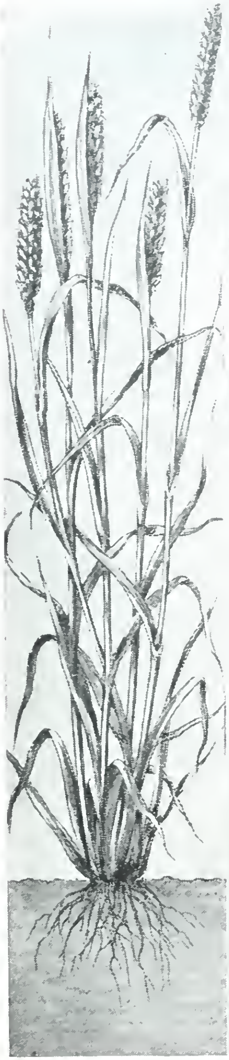
3. This magnified portion of the endosperm shows cells packed with starch.



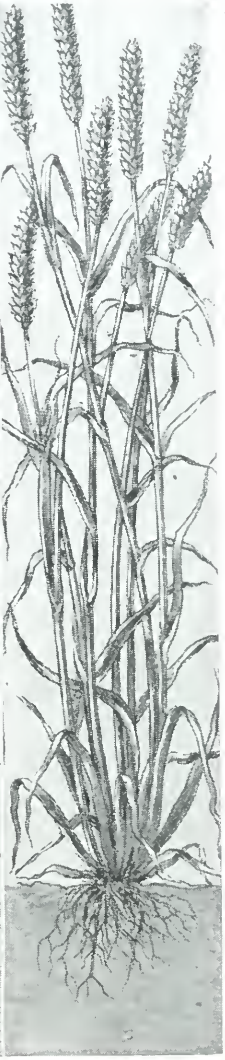
4. When the seed germinates, the roots burst out and spread to draw nourishment from the soil.



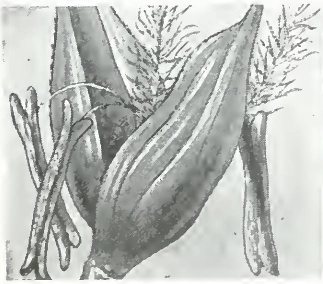
5. The rod is really a hollow sheath inclosing a green core, which develops into stem and leaves.



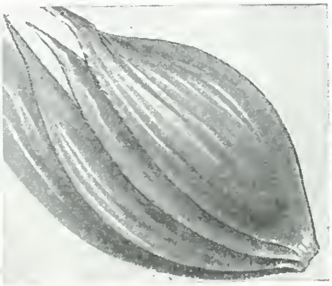
6. This is the wheat plant in flower. Male and female parts appear on the same plant.



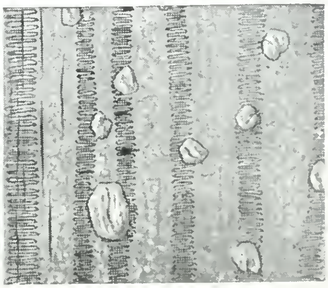
7. Here is the ripe wheat plant. It will be seen that several stems grow from one root.



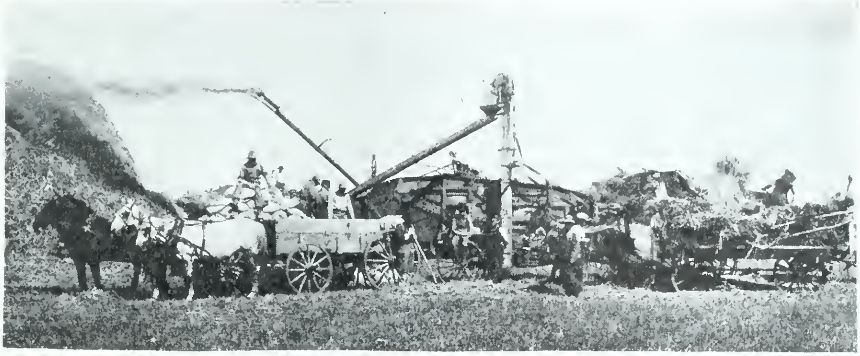
8. This is the wheat flower magnified. Wheat is a grass, as we see by looking at grass flowers.



9. The wheat grain is inclosed in a husk, or protective covering. The husk is chaff and bran.



10. Growing wheat absorbs the element silicon from the soil, and forms it into silica crystals.



A threshing machine at work in the fields.

THE WONDERFUL STORY OF WHEAT

OF all the food plants of the world Wheat is king. In proportion to the nourishment it yields it is the cheapest of all foods, and a scientific comparison of wheat bread with meat shows that one gets about ten times as much nourishment for the money in bread as in meat. And wheat has a very wide range, growing on almost any soil and in any temperate climate.

The story of wheat is the story of our civilization. Wherever the white man has gone he has taken this king of plants with him; so that the spreading of wheat over the virgin lands of the world has followed the spread of the white population.

A scholar writing on this subject has said that we are likely to think it is because the European has guns that he has spread all over the globe, but it is really because he has wheat and other plants. His guns would not help him without wheat. Wherever they have appeared the wheat-eaters have mastered and dominated those who live on other plants. He goes on to say that in America the wheat-eaters crushed the people who lived on corn and beans; in India and other parts of the East they gained ascendancy over the rice- and millet-eaters; and in Africa they subjected the sorghum- and tapioca-eaters. It is true that the eastern Japanese overcame the western Russians, but this author's explanation would be that the Japanese have for years been changing more and more from rice-eaters into wheat-eaters.

We can trace most of our cultivated plants back to their wild ancestors. We still have wild plums and apples and cherries, for example, and these grow side by side with the finer and choicer kinds that man has bred from them.

One of the closest relatives of wheat among our wild plants is the couch-grass, but, while wheat is an annual, growing up from seed, producing seed and dying down in a year, the couch-grass is a perennial, living on year after year, producing seed but not dying down altogether.

That man has cultivated wheat for thousands of years, we know. Among the ancient lake-dwellings of Switzerland have been found the small grains of several kinds of wheat, and this proves that, away back in distant ages when man was beginning to conquer nature, he took one of the wild grasses and began to grow it for his own use. From that first step has resulted the multitude of splendid varieties of wheat that thrive to-day.

The story of a grain of wheat has been called the story of man's long struggle for plenty, "the response of Nature to her children asking for food, the emergence of mankind from savagery, when, regardless of anything save the pangs of hunger, the first miller plucked the berry from the stalk and, using his teeth for millstones, ground grist for a customer who would not be denied—his stomach."

THE LONG, LONG ROAD BY WHICH WE GOT OUR DAILY BREAD

It must have been a long, long road by which wheat came, gradually improving through difficulties that might have caused those early farmers to despair. Even when they had their fields planted, and the wheat had come up and possibly ripened, nature and man would often conspire to ruin the fruits of their labor. The wheat would be swept by blight or storm, or be trampled under foot by invading hosts. But the spirit of man triumphed over all these things, and to-day we benefit by the painstaking and persevering efforts of the past.

Dean Swift declared that "whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where only one grew before would deserve better of mankind, and do more essential service to his country than the whole race of politicians put together." But what can be said in praise of the men who have made not two, but many, ears grow in place of one?

The wheat of primitive man was a very poor thing. Probably only one stalk rose from each plant, and the amount of grain must have been small indeed. But now the average number of stalks from a single seed is from six to twelve, and some plants have three or four dozen, all bearing rich heads of grain. One head may yield from thirty to fifty grains, so that a single seed may yield a harvest of three or four hundred grains. This is far better than the best wheat referred to in Jesus' parable.

THE TINY WHEAT KERNEL AND ITS AMAZING STORE OF FOOD

And how has this wonder been performed? By carefully selecting the best heads of wheat and planting the grain from them, and then, when they bore fruit, selecting the best again, and so on through many generations.

Some of the most famous wheats to-day can be traced back to exceptionally fine heads that were often noticed by farmers in walking through the fields. They collected these choice grains and planted them, and so reared a new race of wheat, richer and more prolific than its parents.

Different kinds of wheat are also crossed by placing the pollen of one plant on the flower of another, and in this way a wheat is produced embodying good points of both. All the time men are improving the stock of wheat and getting more grains to grow on a given space. It has been said that, "if a new wheat were bred that would yield only one grain more to each head, Nature would produce annually, without effort or cost for men, fifteen million extra bushels of wheat in the United States alone."

The wheat we grind into flour is the seed, or fruit, of a plant that scientific men call *triticum,* from a Latin word meaning "to grind," or "to thresh." So the scientific name for wheat has embodied in it the story of how the plant is prepared for use as food.

The wheat kernel is a wonderful store of nutriment, unequaled, for its size, anywhere else in nature. Each grain contains a single seed inclosed within walls.

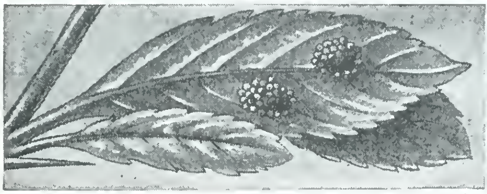
HOW THE FACTORY IN A LEAF MAKES FOOD FOR PLANTS AND MEN

Before the wheat is ripe, and while it is still growing, the seed gradually gets longer, and the sides of the grain fall inward so as to form a groove on the surface, which we can see. If we remove the coat over the small projecting part at one end, we see the embryo—the infant plant—wrapped up in the grain. It is quite easy to distinguish the root end from the bud ends, and by using a needle we can separate the young leaves of the bud. A pocket-lens or a reading-glass will help us to see all these details.

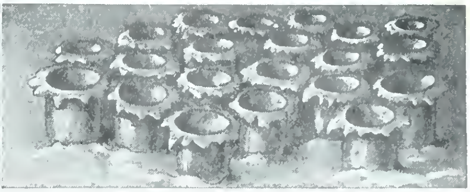
The outer coat of a grain of wheat, consisting of three layers, forms the bran, which is separated from the flour cells inside when the grain is ground up by the miller. The embryo forms only a small part of the grain, and all the rest is material stored up for the use of the plant when it begins to grow. It forms a perfect food for the young wheat plant, and almost a perfect food for man.

When the grain of wheat is planted in the ground, chemical changes begin at once. Some wheats are sown in October or November, and others in spring. The soil is left rough and lumpy, so that the air can get to the roots. When wheat is sown in October, the young shoots appear above the ground while the weather is still cold, and then the plant seems to make little or no progress till the warmer

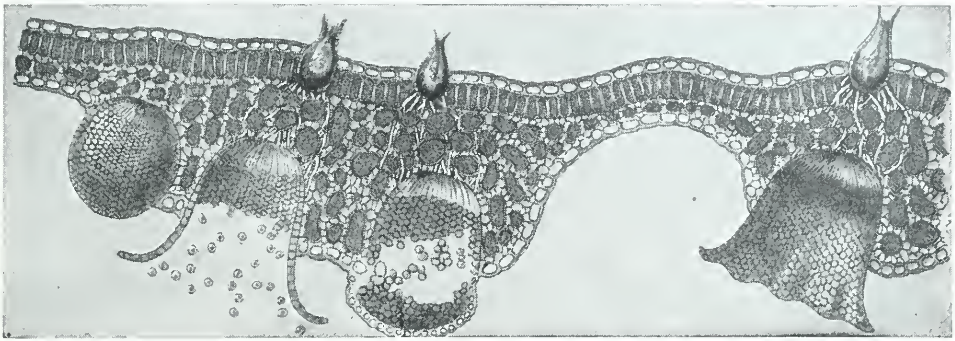
PICTURE-STORY OF A PLANT PLAGUE



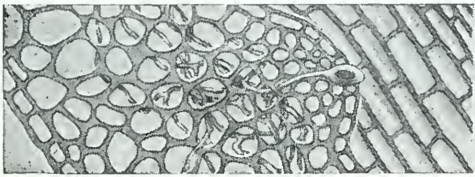
1. The leaf of the barberry when affected by rust.



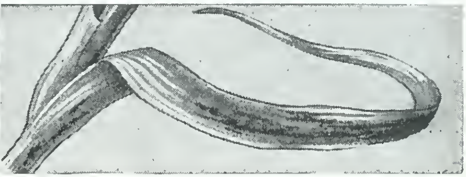
2. Magnified, the rust looks like a cluster of cups.



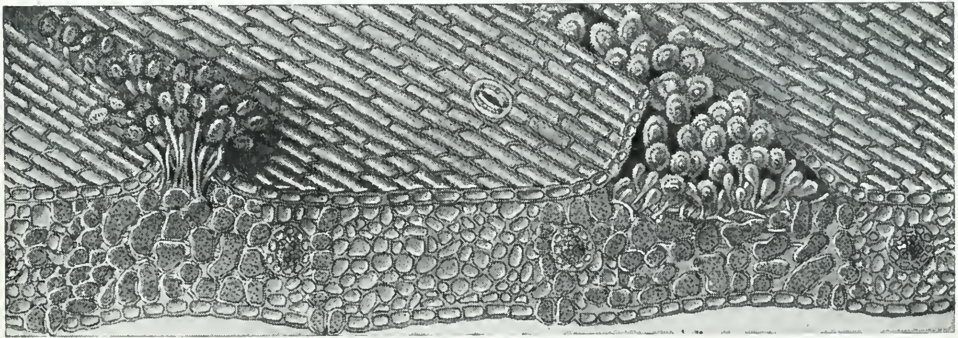
3. Here is a transverse section through the barberry leaf. The rust has penetrated the tissue, forming different kinds of bodies on both sides of the leaf. Those above are flask-shaped, and produce spore-like bodies. Underneath are the cluster-cups, open and empty. The middle ones show the spores escaping.



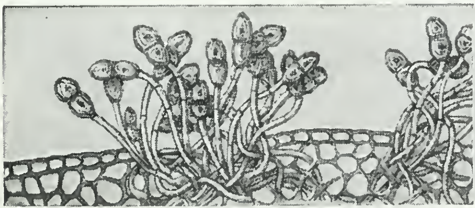
4. When the spores escape they are blown on a wheat leaf, and enter through its pores. The spores germinate, and filaments spread through the tissue.



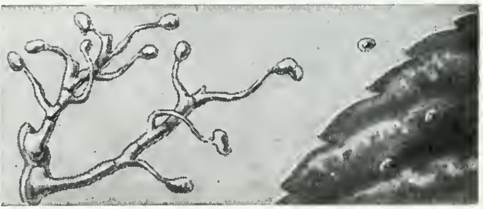
5. The previous picture shows what we can see through a microscope, but all the naked eye sees is the rusty color known as wheat-rust.



6. This picture of the magnified surface of the wheat leaf and a section through its thickness, shows what happens. After penetrating the leaf and draining its vitality, the rust fungus branches near the surface and produces spores. These cause a swelling, which bursts, and spores are blown to other wheat plants.



7. When wheat is ripening, a strange thing happens, the rust producing another kind of spore.



8. The spores rest through the winter and in the spring produce spores which grow on barberry leaves.

days of spring. This appearance of inactivity is deceptive, however, for the hidden roots are growing all the time, and the crop to be gathered in the coming summer depends on the development of the roots in the winter. One great advantage of sowing wheat in the autumn is that less seed is required. The winter seed yields more freely.

While growth is going on in the wheatfield the leaf is acting as a factory, producing starch, gluten and oil which are stored up in the seeds as nourishment for the future plants. As many as fifty shoots are sometimes produced on a single plant.

THE THING THAT MAKES WHEAT VALUABLE FOR THE BAKER

The substance which makes wheat so valuable for the baker is gluten, a sticky, elastic substance sometimes called wheat gum, which enables wheat flour to be made with water into a dough. It is the gluten that makes bread so digestible. The wheats grown on good soil in northern latitudes, with a short season of growth, are far richer in gluten than wheats that have a prolonged growing-period.

In spring the plant makes great progress. The parts of the stem between the nodes—the thick places where the leaves grow out—lengthen rapidly. The stem increases in width as well as in length, and as the inner tissue is torn in the process, the stem becomes hollow except at the nodes, where there is a partition right across. It is the partitions at the nodes that make a wheat stock hard at intervals. In early June the sheath of the highest leaf begins to swell, and a week or two later a flower-spike emerges from the sheath.

THE ROOTS OF THE WHEAT AND THEIR SHARE IN RIPENING THE GRAIN

The wheat plant is wonderfully adapted for pollination by the wind, although, as we have already seen elsewhere, it is often self-pollinated—that is, it is pollinated by its own pollen falling from the stamens of the flower upon the stigma. The spike of flowers grows well up into the air, and the ripe anthers which bear the pollen are pushed well out. Being on long, fine filaments, they dangle freely, and as they swing easily, the pollen is shaken off on to the stigma, which is well supplied with hairs, so that the pollen is easily caught. The plant now begins to draw on the large amount of food stored up in its roots, and with this ripens the grain. The roots penetrate the soil to a considerable depth, so as to draw plenty of nourishment, and if the various parts of the root were placed in a continuous line they would reach for hundreds of yards.

The wheat plant stands up well, although it is so frail-looking. The reason is that the stalk is strengthened by much flinty matter which it picks up from the soil. There is no finer example of strength combined with lightness and economy of material than the wheat stalk.

A good wheat grain is plump, and has a smooth and thin skin, and when cut across it should look semi-transparent. There are, of course, many kinds of wheat, but they may be divided into two main classes—the strong wheats and the weak. Strong wheats are those with a large proportion of gluten, making a good, light loaf. If two loaves are made from equal amounts of flour, one from strong wheat and the other from weak, they will show a remarkable difference in size, shape and texture. The strong wheat, owing to its richness in gluten, makes a fine, well-risen loaf, porous throughout and uniform in texture. The weak wheat makes a small, flat loaf, unappetizing and hard to digest.

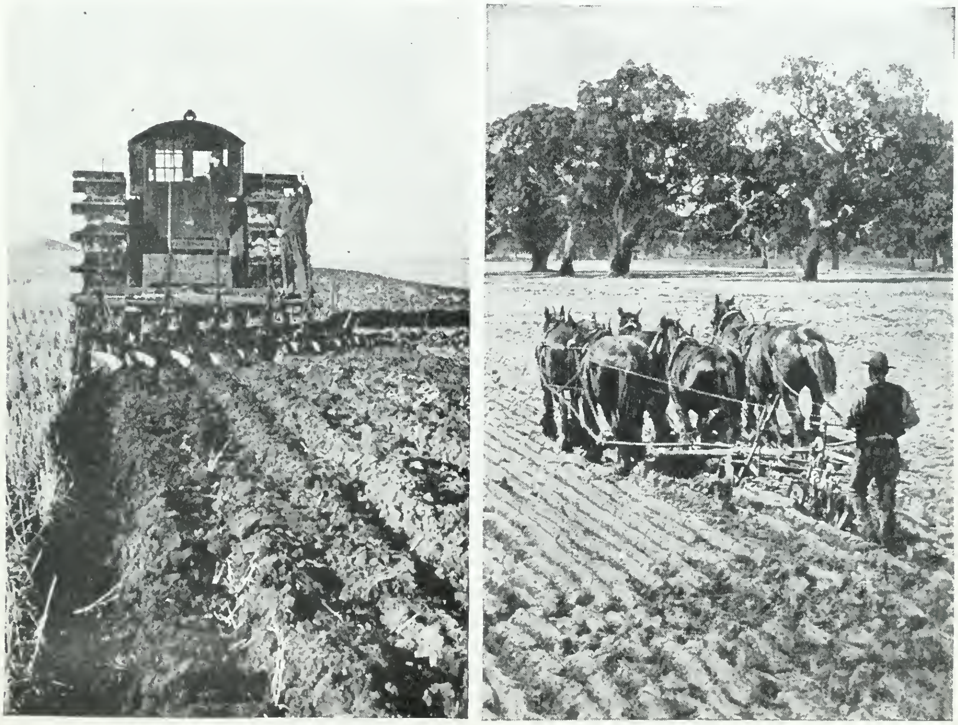
STRONG WHEATS AND WEAK WHEATS, AND WHERE THEY GROW

The strongest wheats are grown in Canada, the United States and Hungary; while wheats grown in many other parts of the world are weak. A wheat known as Rivet is extraordinarily weak, and a loaf made from it is only a flat cake. Unfortunately the supply of strong wheats is limited, so, in order to balance matters, the practice is to blend the flours, mixing a proportion of strong wheat with weak. This plan works very well.

Exhaustive attempts have been made over a course of years to grow strong wheats in England. Samples were collected from every country where they are produced, but it was found that when these were grown in England they were no stronger than the ordinary home-bred English wheats. One strong wheat, however, the Red Fife from Canada, was found to be unlike the others. When grown in England, it continued year after year to produce strong wheat. Nevertheless, the difficult problem of producing strong wheats in England was not yet fully solved, for, though the Red Fife

PREPARING THE EARTH FOR THE HARVEST

PLOWING IN THE GREAT WHEAT-FIELDS OF THE WEST



THE NEW AND THE OLD WAY OF PLOWING

continued to yield a strong wheat, it yielded poorly, and crops could not be made to pay. But Professor Biffen, of Cambridge, who had been studying wheat production, crossed Red Fife with some of the best-yielding English varieties. He succeeded in producing a fine new variety known as Burgoyne's Fife, which had the vigor and yielding power of the English parent and the strength of the Red Fife. This wonderful wheat has taken many prizes, and now commands a very high price compared with other British wheats.

THE DIFFERENT SOILS AND CLIMATES THAT DIFFERENT WHEATS NEED

The best wheats grow in warm and fairly dry climates. It is found that in hilly districts the plants are small and the yield scanty, while in wet areas the straw is very abundant but the grain is poor. Wheat is cut before it is fully ripe, just when the grain no longer gives a milky juice if pressed between the fingers. After being cut, the grain ripens while it is in the shock and in the stack. Winter-grown wheat has the longest period of growth of all farm plants, for its complete life-story occupies nine or ten months.

The necessity of having a wheat specially suited to the climate and soil of the district in which it is proposed to grow it, was clearly proved in France in 1871, after the Franco-Prussian War. The provinces had been ravaged by the Germans, and the peasants had been unable to sow their wheat in autumn as was their custom. But when the war was over and springtime came, the seed grain, even where it had not been eaten owing to shortage of food, was unsuitable for spring sowing. What was to be done?

HARNESSING THE AIR TO FIND NEW FOOD FOR THE SOIL

One of the committees formed to help the people in their distress obtained some spring-sown wheat which they knew did well in England. They distributed this among the peasants, thinking it would flourish equally well in France. The seed was planted, but trouble soon arose. The climates of England and France differ a good deal. The hot, dry summer not only comes earlier in France than in England, but is also hotter and drier. It arrived before the wheat had had time to grow to maturity. The poor peasants, therefore, saw the empty ears of wheat withering for want of rain. Yet, while this was happening in France, the same sort of wheat was growing rapidly in England, and when the hot weather came, in August, it ripened splendidly. It was made clear, therefore, that the production of varieties of wheat to grow in particular districts is a matter requiring the greatest skill.

As the world's population increased, the boundless wheat harvests of America gave the world all the wheat it needed, and men were beginning to feel that the supply was limitless. Then Sir William Crookes, the famous chemist, gave them a rude awakening by announcing in 1898 that unless the chemist came to the rescue of the world, there would in a few years be a grave wheat famine. All the wheat-producing areas of the world were fast becoming occupied, and unless these could be made to produce larger crops, the supply must fall far short of the demand.

Cheap production was needful if wheat was to be available for the masses of the people, and as the wheat-growing lands were getting exhausted, and the available supplies of nitrates and other soil-foods were being used up, it was only by the aid of the chemist, harnessing the nitrogen of the air and making it ready for the growing plants, that the wheat crops could be maintained.

THE ENEMIES THAT PREY FOREVER ON THE GRAIN

There were those who scoffed at Sir William Crookes's idea, and what he said has not been fully confirmed. Already the chemists are seizing upon the nitrogen of the air and using it to feed the soil. But the outstanding fact is that the wheat crops of the world are not increasing. They are actually less than they were a few years ago, and as the newer countries on this side of the Atlantic grow in population, they will want an ever increasing proportion of their home-grown wheat, so that there will be less and less available for European countries. However, there is still much unused land in America suitable for wheat.

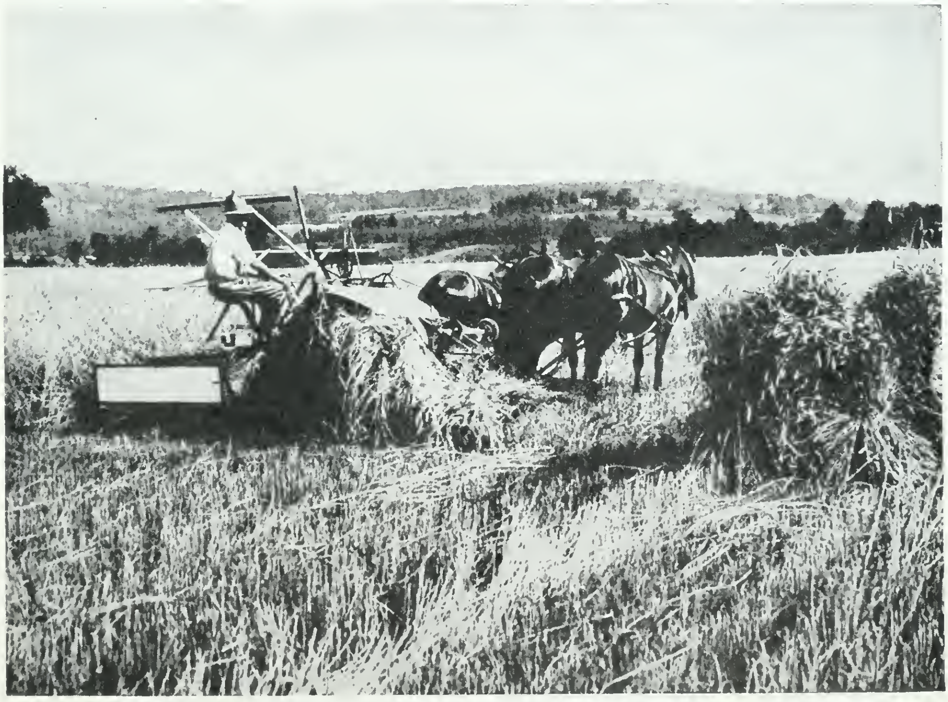
At present the world's wheat crop is about 3,000 million bushels a year, of which nearly half is grown in the United States and Canada. India grows wheat, but she must always be a precarious source of supply, as her crops are dependent on the monsoon rains, which often fail.

Argentina and Australia both grow large amounts of wheat, and Russia formerly grew a great deal. Other countries

THE GLORY OF THE WHEAT

THE FLOWERING FIELDS OF WHEAT ON THE SPACIOUS PRAIRIES OF THE WEST

In the West we may see many great fields of wheat extending as far as the eye can see. It is a beautiful sight to see the wind ripple over the fields of standing grain.



A REAPER AT WORK IN THE FIELDS

The self-binder cuts the grain and ties it into bundles with twine. This machine is one of the most important inventions ever made in agriculture as it saves an immense amount of labor and time.

grow smaller quantities. Few grow enough to supply themselves.

Wheat possesses many foes against which the farmer has to wage a continuous warfare in order to save the grain that is grown. The long-tailed field-mouse and the harvest-mouse devour the growing grain; the common mouse and the rat attack it in the stack; insect pests like the wheat bulb-fly, the chinch-beetle, the army-worm, the Hessian fly and the wheat-midge attack the growing plant; and various funguses prey upon it, of which the notorious wheat-rust is the worst.

A SHRUB AND A FUNGUS, AND THE HARM THEY HAVE DONE

The story of this fungus is a romance. The rust of wheat makes its presence visible by brown or black streaks on the leaves, but at that stage the mischief is done. The substance of the leaf has been destroyed, and it is the leaves of a plant that make the starch which fills the grain. It is plain that, with the plant's starch-making machinery crippled or destroyed, the grain will be small, or even worthless.

It was known centuries ago that those brown and black streaks on the wheat leaves were caused by a fungus, and the microscope revealed that the powder on infested plants was made up of fungus spores corresponding to the seeds in a flowering plant. At the beginning of the nineteenth century Sir Joseph Banks made a study of this fungus disease of wheat, and found that the fungus spread through the spores' entering the tiny pores of the wheat leaves.

One strange thing the farmers noticed was that the rust appeared only where the barberry plant grew. If there was no barberry in the district, there was no rust on wheat. Now, by patient investigation the true life-story of the rust has been unraveled, and a remarkable story it is.

HOW THE WHEAT-RUST GOES OUT ON THE WIND TO SEEK NEW VICTIMS

Toward the end of summer the upper surface of the barberry leaves bears yellow or orange patches. This is the beginning of the rust fungus, known at this stage as barberry-rust. Seen through the microscope, this fungus on the upper side of the leaf has the appearance of small yellow flask-shaped objects. The fungus eats its way through the barberry leaf to the other side, drawing nourishment as it goes, and sapping the vitality of the plant. On the other side of the leaf there now appear small orange-colored globular bodies which open after a time and throw out spores. These are blown by the wind, and alight on the leaves of any wheat that may be growing near, where they germinate, throwing out filaments that penetrate the wheat leaf and extract nourishment from it. The leaf swells, and after a time streaks of a rusty brown color, which are really the spores produced by the fungus, appear. What has happened is this: The fungus, having developed in the leaf, produces a spore known as a *uredo* spore—or a blight spore, as the name means. The name was given because the wheat looks as if a fire had swept over it, and uredo comes from the Latin word for "burning." The skin of the wheat leaf is burst open, and the spores escape. They are blown by the wind to other wheat plants, where they develop into fungus and themselves produce spores.

THE PEST THAT PUTS ON A NEW COAT FOR THE WINTER

And now a strange thing happens, for when the wheat plant turns yellow near harvest time, the fungus realizes that it is time to pack up and move for the winter. So it now produces a different kind of spore, called a *teleuto* spore, teleuto meaning "completion." With these spores the rust completes its story for the year, and the teleuto spores fall on the ground and rest there through the winter months. In spring they germinate on the ground, and make new spores, but the wheat plants for the new year are only just peeping above the ground, and would not be a suitable host for the fungus. The spores, therefore, do not settle on the young wheat. Instead, they look for the chance of being blown on the opening leaves of the barberry plants near by, where they develop, and the cycle of life begins again.

It is a wonderful life-history, and only in recent years has it become known. The simple remedy seems to be to root out all the barberries in the district, but unfortunately the rust can sometimes manage without the barberry, as in Australia, where some other plant may act as host.

But the most effective method of fighting rust is breeding a wheat that is rust-proof. There are several varieties which are grown with success in districts where the rust is common.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 1851.

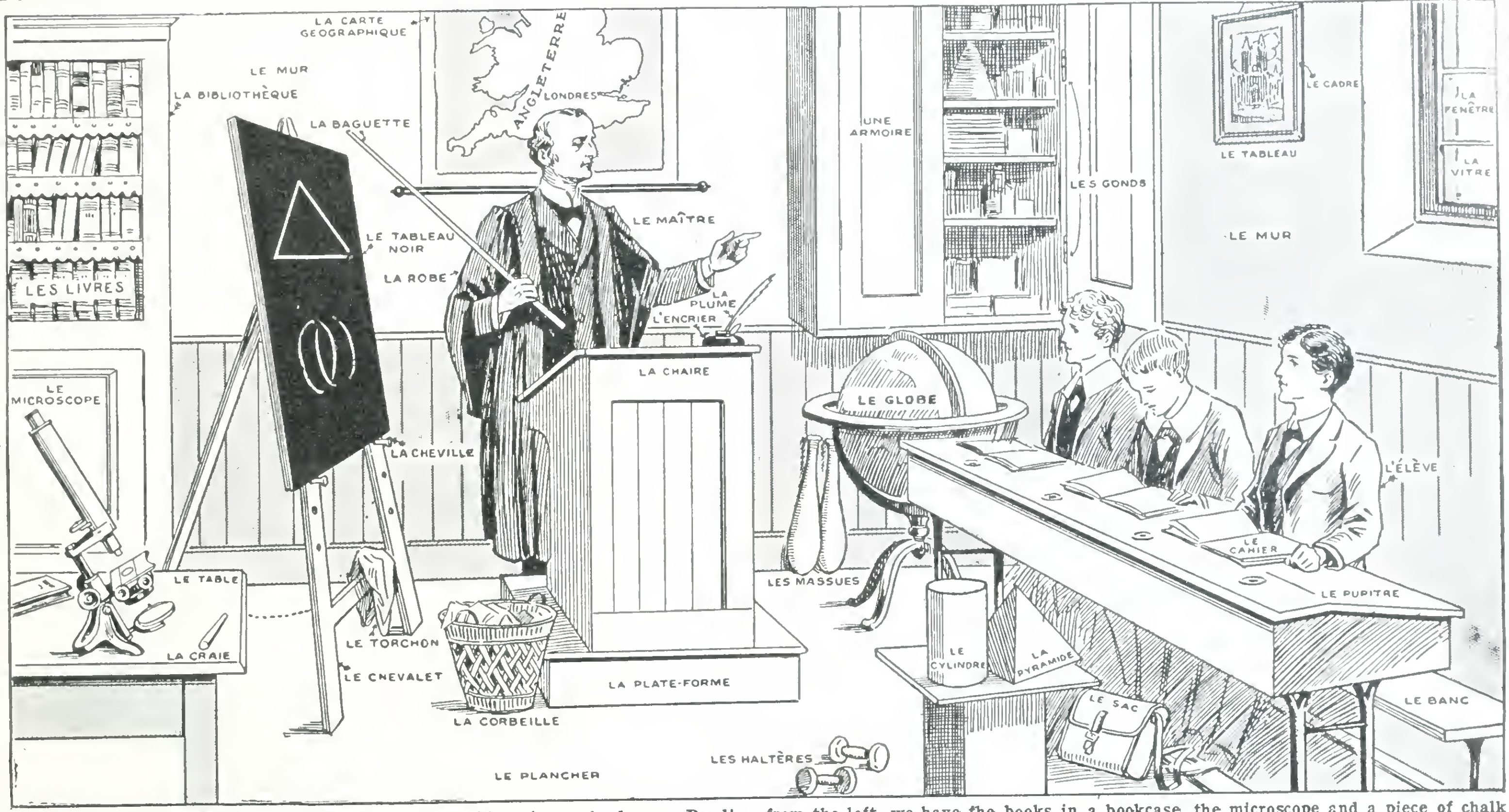
HARVEST TIME IN THE WHEAT FIELDS

LOADING THE WHEAT AT THE END OF THE DAY'S WORK

THE WHEAT BOUND INTO SHOCKS READY FOR CARTING

Photos, courtesy of the Australian and Canadian Governments and the Canadian Pacific Railway.

A FRENCH LESSON IN PICTURE: THE NAMES OF FAMILIAR THINGS IN A SCHOOLROOM


LA CARTE GÉOGRAPHIQUE
LE MUR
LA BIBLIOTHÈQUE
LA BAGUETTE
ANGLETERRE
LONDRES
UNE ARMOIRE
LES GONDS
LE CADRE
LA FENÊTRE
LA VITRE
LE TABLEAU
LE MUR
LE MAÎTRE
LE TABLEAU NOIR
LA ROBE
LES LIVRES
LA PLUME
L'ENCRIER
LA CHAIRE
LE MICROSCOPE
LE GLOBE
LA CHEVILLE
L'ÉLÈVE
LE CAHIER
LE TABLE
LES MASSUES
LE PUPITRE
LA CRAIE
LE TORCHON
LE CHEVALET
LE CYLINDRE
LA PYRAMIDE
LA PLATE-FORME
LE BANC
LA CORBEILLE
LE SAC
LES HALTÈRES
LE PLANCHER

This picture gives the French names for the familiar things in a schoolroom. Reading from the left, we have the books in a bookcase, the microscope and a piece of chalk resting on the table, and the blackboard supported on the easel by the pegs. The duster and the waste basket are below. On the wall hangs a map of England, in front of which the master, in his robe, stands at his desk on the platform, holding the pointer. The pen rests in the inkwell on the top; on the floor below are dumb-bells, a satchel; and behind the globe are Indian clubs. The pupils sit on the bench, with copy-books before them on the desk, in front of which are the cylinder and pyramid for a drawing lesson. To their right is a cupboard, with hinges of the door indicated, and behind them, in its frame, hangs a picture to the left of the window, with its panes of glass.

TOY FURNITURE FROM SCRAPS OF WOOD

TOY furniture is sometimes made from paper, but it proves more satisfactory when it is made from wood. Nearly every boy or girl can find suitable scraps of soft wood, even though he has to visit the grocer and then break up old packing boxes to get it. Of course toy furniture may be bought at a toy shop, but this does not give you the fun of making it either for yourself or for little sister or brother.

The table and the chair shown in Plate I are easily made from soft wood with the aid of a saw, a hammer, a few wire nails and a sheet of fine sandpaper. This chair is made from three pieces of 3/8-inch wood, as shown in Plate II. If you do not have wood of this thickness, either 1/4- or 1/2-inch material can be used. In constructing a chair of this particular size you will find it easier to cut out one piece of wood 2 inches wide and about 6 1/2 inches long. From this piece cut one piece 3 3/8 inches long for the back; another piece 1 1/4 inches for the front (legs) support; and still another piece 1 1/2 inches for the seat. If you have carefully marked and cut these parts so that the ends

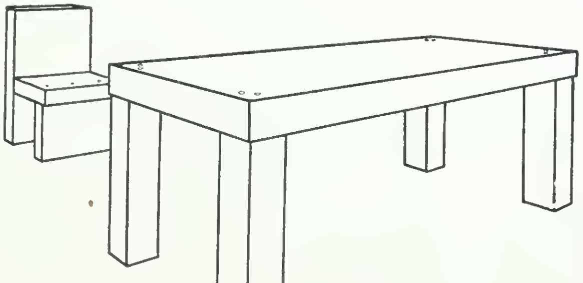


PLATE-I.

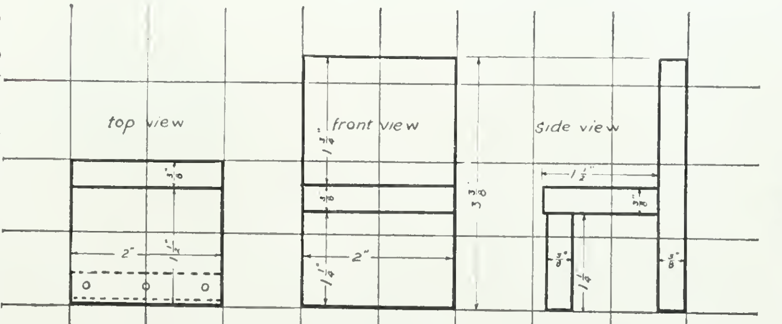
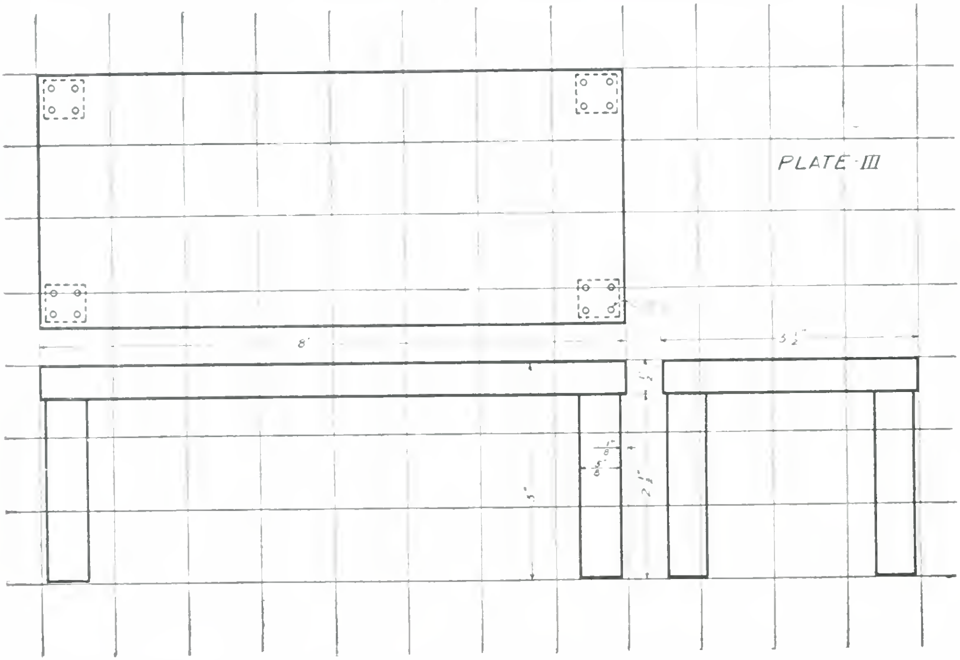


PLATE-II.

are square with the edges, you have only to use fine sandpaper to finish the surfaces and to remove any rough edges.

After shaping and finishing the parts, you are ready to assemble them by nailing in the proper positions, as shown in the side view of the working drawing (Plate II). In order to have the seat of the chair exactly level, you should be careful to measure and mark off the actual length of the front leg piece on one side of the back piece, as shown in the front view, before beginning to nail. Above this line one-half of the thickness of the wood, nail through the back of the chair into the seat, which is flush with the sides of the back, with 1-inch wire brads. Likewise, by placing the piece for the front legs slightly inside of the front edge of the seat, nail through the top of the chair seat into this piece, as shown in the top view. If you have carefully followed these directions, your chair should stand firmly on the floor or any other level surface. If you should want more than one chair for this set, you will find it possible to construct each additional one more quickly than you did this first one.

This *table* is made 3 inches high so that the seat of the chair may be pushed under it. As may be seen in Plate III, the table consists of a top and four legs. The top is made from ½-inch soft wood and requires a piece 3½ inches wide and 8 inches long. The legs are made from ⅝-inch-square stock, although wood ¾ inch, ⅞ inch, or even 1 inch in thickness may be used. In shaping the legs it is more satisfactory to secure a piece about 10½ inches long from which each of the four 2½-inch legs may then be cut. After sawing out the top and legs, the surfaces and edges are finished with fine sandpaper. The table is then assembled by placing each of the four legs ⅛ inch from either edge of its corner of the top and by nailing it in position, as shown in Plate III. If carefully laid out and constructed, the table should now rest firmly on all four legs.



The table and chair or chairs may be finished by staining a suitable shade or by using attractive water-color paints for a base color to which a simple design of a brighter color may be added. Such a design is usually placed on the back of each chair and on the corners, and possibly the centre, of the table-tops. In either case, a coat of floor- or furniture-wax may be used as a final finish.

Other pieces of toy furniture, such as beds and the like, which can also be made from these scraps of wood, will suggest themselves to the resourceful boy or girl who enjoys this work.

DEFECTS AND BLEMISHES IN LUMBER

No kind of tree produces lumber that is entirely free from defects and blemishes. The same irregularities in the wood, natural and accidental, are likely to occur in all species; and in all woods used for the same purpose the effect of a certain defect on the strength and quality is about the same.

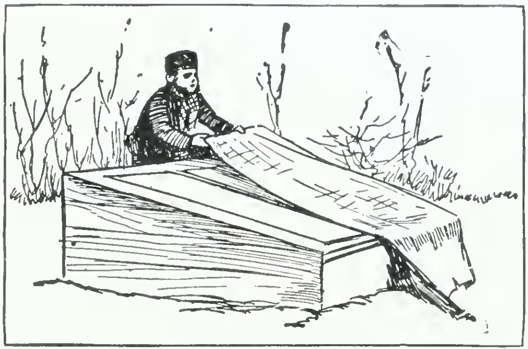
Knots are probably the most common of the natural defects in lumber. Most branches of forest-grown trees originate at the centre of the trunk and grow in diameter and length so long as conditions are favorable. The branch end, or knot, in the trunk is therefore usually shaped like a cone with its apex at the pith. A branch end when sawed through appears on a flat-grain surface as a round knot and in vertical-grain material as a spike knot. Many of the lower branches in forest-grown trees die and fall off when the upper branches cut off too much of their light. As the tree continues its diameter growth, new wood surrounds the stubs of the old branches. When the log is cut up, these covered stubs are found in the lumber as encased knots.

All woods are more or less subject to the attack of some decay-producing fungi which work in the sapwood or in the heartwood. Checks, cracks, splits, casehardening, honeycombing, warping and other seasoning defects are likely to be found in any kind of wood. Manufacturing defects, such as planer skips, occur in all species.

PROTECTING PLANTS AGAINST COLD

WHAT to grow in the fall of the year depends entirely upon the weather. It will be better to do no more planting in our gardens, because, even if it is not actually frosty at the time of planting, probably it will be before the roots of the plants become settled in the soil, and this might cause them to decay and die. Yet, if we may not plant, still we must not neglect our gardens. Suppose we put in two or three new rose trees, and perhaps some rose cuttings, which are so charming to grow, as they make what is called "roses on their own roots," and there is never the fear of suckers, which are often extremely troublesome.

Now we will suppose a spell of frost comes, and after that, naturally, a thaw. The ground becomes quite soft and loose. Those newly planted subjects—whether roses or anything else, for that matter—that are not firmly established in the soil, become loosened with the soil, and lose the little grip they had obtained of it. This is the one thing to fear, for if it happens and is not remedied, without a doubt the plants will die. But, happily, it is a state of things quite easy to remedy. It simply means treading or otherwise making the soil firm and close about the plants, as it was before the frost acted upon it. The loose-soil danger is then avoided.


Protecting tender plants.

Though the action of the frost on the soil may be a source of danger to newly planted trees and cuttings, we must bear in mind that, apart from this, the frost does a great deal to sweeten the soil and makes it in excellent condition. For this reason any bit of the ground that is not occupied by plants should be dug up so that the frost may penetrate and do the utmost good.

How does a gardener regard a heavy fall of snow over his many plants? As Nature's wisest and best protection from the bitter winds and frosts. No wind can hurt our plants when they are safely under their snow blanket. But often the winter winds and frosts are keen and biting when there is no snow upon the ground. This is the hardest trial our plants have to bear.

If we are able to gather a few armfuls of fresh straw, we may put it round such plants as the rhododendron, and even round about a rose tree of a more than usually tender nature, and anything else for which we have reason to fear. If some of these rather tender subjects die down completely, and are below ground for the winter, we may cover the earth above them with dry leaves or with ashes. Either of these is very helpful in keeping the frost from reaching them.

It is necessary to pay frequent attention to violets at all times if they are growing in frames and we have undertaken the care of them.

Never coddle violets; they are hardy, brave little plants, and they strongly object to being treated as if they were tender and fragile. If they could speak, how often they would plead for air, air, air, more air! You ought to have gathered many pretty blooms by this time even from a 6-by-4-foot frame, and have the prospect of gathering a fine bunch on Christmas morning, though the time the plants flower will, to a certain extent, depend upon the variety which is being grown. Very little water—generally none at all—is needed for weeks together at this season. Unless the thermometer shows that it is freezing, or there is a sharp wind, raise the lights during the warmest portion of the day. Even at night, unless very cold, the lights need not be quite close down, but the opening can be covered with a bit of sacking, and in this way there will be a slight amount of ventilation.

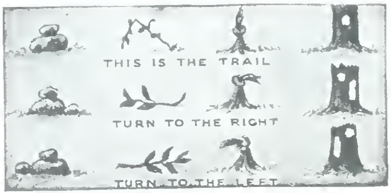
You will think, perhaps, that great importance is being laid on giving them sufficient air. But there is nothing like it to keep them healthy. Insufficient air generally means that leaves become affected with mildew, and whole plants may "damp off," as it is called. But in really severe weather, we must run the risk of that for a short time. During sharp frosts the lights go down, and mats or anything we can lay hands on may be used to cover them.

Our pot plants that we are sheltering in the house or in a greenhouse will now need less water than at other seasons when they are growing freely. In the winter a great many of them go almost to rest; at any rate, they are not pushing out new growths unless kept at a high temperature. Never let pot plants stand in a saucer of water.

THE SILENT MESSAGES OF THE RED MAN

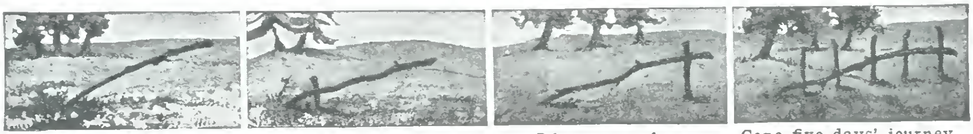
ALL readers of Fenimore Cooper's Red Indian stories know how clever the red men were at following a trail and reading the silent messages which their friends had left for them, and which would pass unnoticed by most of us.

This was, of course, in the last century, before civilization had spread into the Far West, but even now the Indian is very clever at giving and receiving silent messages, and some of the signs he uses are well worth knowing. They will be particularly useful to Boy Scouts and all who love to spend their spare time in the open country.



Stones, twigs, grass and tree signs.

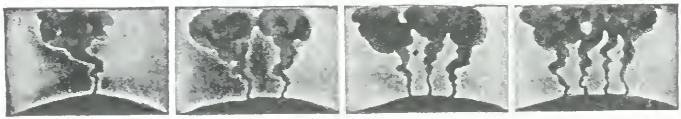
The red man can make use of any common object of the countryside to convey his message. If he wants to tell his friend who follows an hour or a day later which way he has gone, the road is marked by a series of stones every here and there, one being placed on another. Or, if there are no stones, a twig from a bush or tree is stuck in the ground at intervals, or a bunch of grass is knotted as shown in the picture, or a mark is made on a tree-trunk. If the friend following is to turn to the right or left, the direction is indicated by a third stone or by the direction in which a twig is laid or the knotted grass is twisted, or a second mark is placed on a tree.



I am going east. I have not gone far. I have gone far. Gone five days' journey.

TELLING A STORY WITH BRANCHES AND TWIGS

Sometimes a more permanent and substantial sign is fixed up. For example, a stick or small branch of a tree is stuck in the ground slanting-wise and according as its free end points to the north, south, east or west, so an observer could know which way the traveler had gone. If the one fixing up the sign wished to indicate how far he was going, he would place another smaller stick upright in the ground against the slanting stick. If it was near the fixed end it meant he had not gone far, but if it was near the free end of the slanting branch the traveler had gone a long distance. By placing a number of uprights along the slanting stick the red man would show how many days' journey he had gone. Two sticks crossed means: "This path is not to be followed." A circle drawn on the ground, with a stone or another small circle inside, means: "I have gone home." An arrow drawn in the dust of a road shows the route to follow, and there are large numbers of similar signs which can be used and will be found most interesting.



The camp is here. I am lost. Good news. Summons to meet.

TALKING TO DISTANT FRIENDS BY SMOKE SIGNALS

But not only does the Indian use such methods for the purpose of leaving information behind him: he has a vast code of signs by which he can talk to one of his own or a friendly tribe without speaking an audible word. Here are a few examples. Night is indicated by closing the eyes and inclining the head as though it were on a pillow. Day is shown by joining the thumb and forefinger, describing a circle with them, and pointing from east to west. Hunger is shown by sawing across the breast with the hand; scratching the chest means fire; the earth is indicated by pointing to the ground; to speak of a house or tent, the red man places his two hands together to form the shape of a gable roof; when he wants his friend to look at something he points to his eye and then at the distant object. "I understand" is shown by making a circle with the thumb and forefinger, and passing it away from the mouth. Wherever possible, an action was indicated by imitating the operation, as in drinking, eating, burying something, and so on. The smoke of fires was formerly much used by the Indians for sending messages to friends a long distance away in a level country like the prairie. The number of fires which were lighted varied, and the rising columns of smoke conveyed the message according to a previously arranged code system. Thus, for example, as shown in the above illustration, one column of smoke would simply indicate the position of the camp; two fires with two rising columns of smoke would be a signal of distress, meaning: "I am lost"; three columns mean: "I have good news to tell"; four would indicate a summons to a council of chiefs, and so on. It is not necessary, of course, to copy the actual signs used by the Indians. We can take their idea and elaborate the suggestions which they give, and adapt the signs so that they are suited to the particular country which we happen to be living in.

ANSWERS TO THE PICTURE PUZZLES ON PAGE 1654

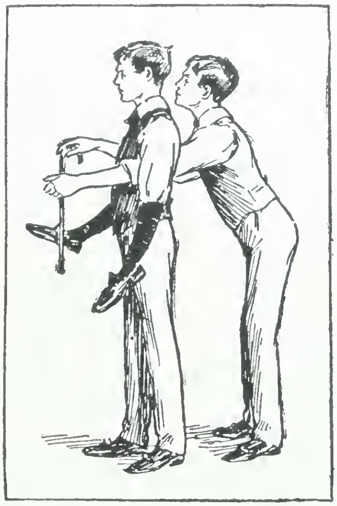
The following solutions are the correct ones:

1. The shells are those of a walnut, but the kernel is that of a Brazil nut.
2. The crescent of the moon is in a position in which it never appears to us.
3. The buttons on the man's coat are on the left, whereas they ought to be on the right side.
4. This chicken has a duckling's beak.
5. A lion cannot climb a tree.
6. Hens and chickens never enter a brook, pond or river for the purpose of taking a swim.
7. Tigers do not eat grass or hay, but live entirely upon flesh. They are carnivorous.
8. The rabbit in the picture has a tail similar to that of a squirrel.
9. This curious animal is an echidna, commonly called an Australian ant-eater. In this drawing it has the hind legs of the ornithorhynchus. The hind legs of the echidna are shaped backward and outward, and are not webbed.
10. The antelope shown is found in hot countries, and could not live in the Arctic regions.
11. The boy is mounting his pony from the wrong side. The correct side from which to mount is the left or near side.
12. The boy is writing with his right hand and the mirror reflects him also writing with his right hand, whereas a mirror reverses everything it reflects.

THE LIVING MARIONETTE

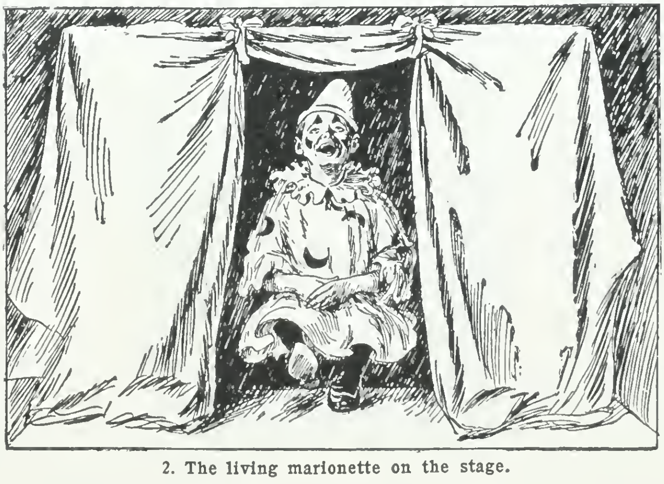
THIS is a variety of entertainment that furnishes great diversion, and it is not at all difficult to do. Two players—one of them able to sing funny songs, recite and tell stories—may give genuine entertainment to a large company by a living marionette performance. Almost every house contains all the apparatus required for the performance, as a few cast-off garments are all that is necessary in the way of attire.

The name often given to the entertainment is the German Dwarf, but a rather more appropriate name is the Living Marionette. A marionette is a doll, or puppet, that is made to walk, dance, or do acrobatic feats by pulling strings attached to it, and concealed from the audience. The living marionette is not a doll, but seems to be a little man or boy about two feet high, with an amount of agility that no boy possesses.



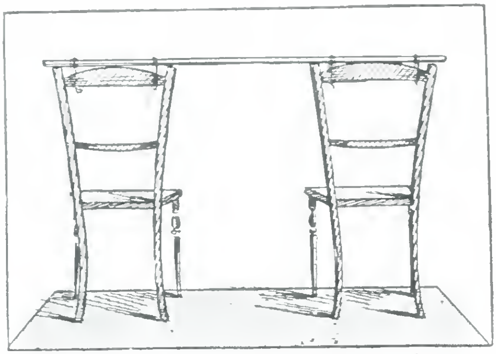
1. Making up for the living marionette.

Two boys give the entertainment, and the first thing they must do is to provide a miniature stage. A table will do nicely, but it should have above it a curtain or some dark cloth. Picture 3 shows how to construct a very good, but a very simple, curtained stage. Here two chairs are placed on the table with a space between them, and a long stick or a pole is tied to the top rail, going right across both. From this stick or pole a curtain is hung so as to represent the surroundings of a little stage, which, as seen by the audience, looks like picture 2. Another good way to make a stage is to arrange a tall clothes-horse with a small board across two of the rails, and then to hang it with a curtain or a cloth. This method is possible only when a clothes-horse with the middle rail of a convenient height is available. This sort of stage without the curtain is shown in picture 4. Yet a third way, perhaps the best of all, is possible only when there are two rooms, one leading into the other. A small table, or a box the height of a table, is placed in the doorway, and curtains or a dark cloth hang from the top of the door. Whatever kind of stage is used, there should be no lights behind it, as a light might show the audience too much.



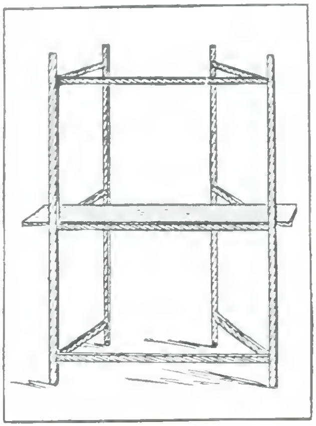
2. The living marionette on the stage.

Let us suppose that the stage is made and that the two players are ready to attire themselves for the performance. One of the boy players—the one who can sing and recite—draws over each hand and up each arm a stocking, and then puts a slipper on each hand. Perhaps, in the dressing up, it would be better to have a stage manager, and a girl makes a very good stage manager. The skill of a girl in the art of make-up is usually greater than that of a boy. Picture 1 shows two boys getting ready for the performance. One stands close behind the other.



3. Stage made with table and two chairs.

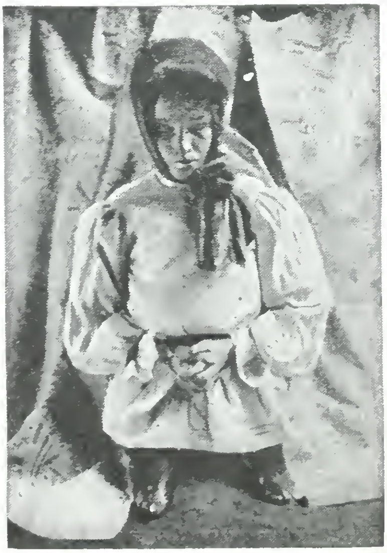
The second boy takes a handkerchief, or a pair of gloves, or a short cane in his hand, and puts his arms around the body of the first boy just under his armpits, as seen in picture 1. Now the stage manager drapes the two boys with a large cloak, or other article of attire, taking care to show the face of one boy only, and leaving visible the hands of the second boy and also the hands of the first boy with the slippers and stockings on. The marionette is ready to give his performance. He takes his stand on the stage, as seen in picture 2, which is a view of the stage from the front, where the audience will be sitting. When everything is in place the stage manager lifts or draws aside the curtain and makes a little introductory speech:



4. Stage made with clothes-horse.

"Ladies and gentlemen, you see before you the only genuine Circassian dwarf who has ever been taught English. His name is Pimpleskivitch, and, although you will not believe it, he is three hundred and sixty-five years old. He has just escaped from Russia, as he thinks he has lived long enough in one country. He arrived the day before yesterday, and has since then learned English perfectly. He will now give you his performance. Pimpleskivitch, begin!"

The stage manager retires, and the dwarf begins. As he sings, or recites or tells stories, he slaps the stage with his feet (really his slippered hands). His hands (really the hands of the boy who is concealed from view) move about, wipe his face with the handkerchief, or twirl the cane. The effect is very amusing if the performer who is seen is able to keep up a running fire of entertainment. The boy behind must keep his body perfectly still, moving nothing but his hands. His is the most unpleasant part, because he cannot see what is going on, although he can hear the laughter and applause. The effect is heightened if the dwarf, or marionette, is provided with a false face, false nose or false beard. If these be not available, he may have his face rubbed with a burnt cork, in which case he can appear as a genuine Congo dwarf.



5. Photograph of a living marionette.

A photograph of two boys giving their entertainment of a living marionette is drawn in picture 5. In this case they are made up to represent a dwarf woman. Picture 2, as may be seen, shows a clown, and this make-up can easily be made by the help of a piece of calico and a few pins. A good deal depends upon the make-up, as a really funny make-up strikes the audience right away, and makes the songs and jokes and dances seem much funnier than they would with a poor make-up. Especially if the performer is rather deficient in humor, he should have a particularly good make-up. With a wider stage two pairs of performers may exhibit at the same time. This increases the probability of success of the entertainment, as it gives the opportunity for dialogue. When there are two pairs of performers it is best that one pair should represent a dwarf woman and the other a dwarf man. Even though this entertainment is very simple, it should be practiced once or twice in private before the first public performance is given. Also the songs or jokes should be carefully committed to memory, that no hitch may occur in the performance. Success depends so much on practice.

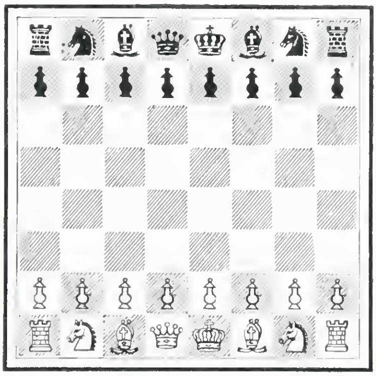
THE GAME OF CHESS

THE game of chess dates back to very ancient times, although no one knows, with certainty, who first invented it.

It is played on the same board as checkers—with 64 squares arranged in eight rows of eight. Alternate squares are black and white. There are 32 men—16 white and 16 black. Each set consists of king, queen, 2 castles or rooks, 2 bishops, 2 knights and 8 pawns.

The two players sit facing each other, with the board between them so placed that there is a white square in the corner to each player's right. The pieces and pawns are arranged as shown in the diagram on this page and it is important to note that the queens must always be placed on squares of their own color.

The men move as follows: the kings one square at a time in any direction—forward, backward, sideways or diagonally; the queens any number of squares in a straight line in any direction; the rooks move any number of squares in any direction except diagonally; the bishops any number of squares backward and forward but only diagonally; the knights move peculiarly—two squares, changing from a square of one color to a square of the other color—that is, they move one square forward or backward and one diagonally. The knights are the only pieces which can leap over squares occupied by other men. Pawns move forward only and one square at a time except on their first move when they may move one square or two. If a pawn reaches the farthest row of squares from its original position, it must be exchanged for any piece of its own color except a king.


How to set the chessmen.

Unlike the men in checkers, the leaping knight does not capture men over which it passes. All pieces may capture an opponent's man (except the king) on the square to which they move. Pawns, while moving straight forward, may capture only diagonally. They have one peculiar capturing privilege, known as capturing *en passant*. When one side, say black, has a pawn advanced to the fifth row, and an adjacent white pawn which has not made its initial move is advanced two squares, the black pawn may capture it as if it had moved only one square—diagonally of course.

Once in a game each player is allowed to "castle" if he so desires. He may move either rook next to his king and place the king on the other side of the rook (although it is a not very closely observed rule that the two pieces must be moved simultaneously or the king first). A player may not castle if he has previously moved either king or rook, nor if his king is in check or either square over which he must pass is attacked by an opposing man, nor if any pieces intervene between king and rook.

When a king is attacked by an opposing man it is said to be checked, and when checking the opponent's king, it is customary and polite for a player to say "check" although this is not compulsory.

The king must immediately get out of "check" either by moving, capturing the checking man or interposing one of his own men between the checking piece and himself. Obviously, he can not interpose a man when checked by a knight.

When a player's king is checked and he is unable to capture the checking piece, move his king to an unattacked square or interpose one of his own men he is "checkmated" and has lost the game. Checkmating the opponent's king, rather than merely capturing men, is the final object of the game, although with a superiority of material, and one's own king in a safe position, checkmating the opponent's king is simplified.

If, when it is a player's turn to move and he can not move his king without placing it in check, and no other move of any man is possible, he is "stalemated" and the game is drawn. The game is also drawn if the force remaining on the board on each side is unable to give checkmate.

If exactly the same position occurs three times in a game, either player may demand that the contest be declared drawn.

A drawn game may also be brought about if either player is able to give "perpetual check" to his opponent's king—i.e., check the king repeatedly move after move, the opponent being either unable or unwilling to avoid the repeated checking.

A player who touches one of his men must move it if he can legally do so and, once he has moved and taken his hand off the man moved, he cannot retract the move.

At the beginning of a game, the players decide who shall move first, either by agreement or by lot, and the player who secures the white men moves first. Subsequently the players move alternately.

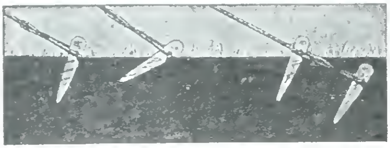
When games are contested between unequal players, the superior player frequently concedes "odds" to his opponent. If the odds are "pawn and move," the superior player conducts the black men and removes the pawn in front of the bishop next to his king (known as the kings' bishop). If a piece is conceded as odds it is customary for the superior player to conduct the white pieces. The usual piece odds given are the queen's knight or the queen's rook or, in the case of a great difference in playing strength, the queen.

Chess is essentially an intellectual game. It has been described as both an art and a science. Actually it is a contest in which the brains and skill of one person are pitted against those of another. Strictly speaking, luck does not enter into the game.

THE WAY TO PUT UP A BELL TENT

DURING the summer months many boys go away to camp, and it is useful to know just how to set to work to put up a bell tent. Even if we do not go to camp, we should know how to erect a tent, as we may have to do this for the cricket match when there is no regular attendant on the ground to do the work.

The tent should be laid out on the ground, with the door on top, and then the pole should be fitted well into the crown, or point, of the tent. As soon as this is done, we should raise the pole with the tent on it, and then, while one holds the pole erect, another goes round and drives the pegs into position. A mistake that is often made is to insert the pegs at too great an angle, under the impression that they are less likely to come out in this slanting position.


The first peg is driven correctly, the second incorrectly. The last two are in soft ground.

The picture shows the right and the wrong angles at which the pegs should be put into the ground. Sometimes the ground is very soft or loose, and the pegs will not get a firm grip. In such cases it is best to dig a small hole and drive the peg in it. Then we fill up the hole, pressing the ground well in with the foot, and we drive a second peg in the surface of the ground, winding the rope round this, as shown on the right of the picture. The double peg gives more than double security. Should it be damp or wet weather, we must loosen the ropes, or the tent and ropes become taut and will pull out the pegs. We should always dig a little trench right around the tent where it touches the ground, as in the case of a heavy rainfall this will keep the floor of the tent dry.

Never erect a tent so that the doorway faces the direction from which the wind is blowing, or the wind will blow straight into the tent, causing much discomfort.

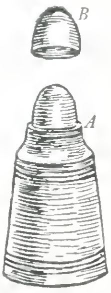
A good idea that is worth carrying out in a camp in sunny weather, all other conditions being such that the idea will not lead to any discomfort, is that of making the tent itself a clock or sundial. If we erect the tent so that the door faces due south, the extreme point on the other side of the floor of the tent where the sun shines may be marked twelve o'clock.

Then, as the sunshine moves round as the day passes, we can mark the exact spot on the floor where the beams fall at the various hours—one o'clock, two o'clock, and so on—and in this way we shall have a sundial that has cost very little time or trouble and no money.

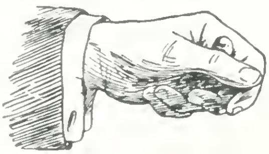
THE VANISHING PILLAR TRICK

VERY simple materials are required for the performance of this very effective trick. The pillar is a block of solid boxwood, a little over 2 inches in height and shaped like *A* in picture 1. With it is used, unknown to the company, a little cap, *B*, of the same material, and of such a size as to fit closely, but not tightly, on the rounded top of *A*. Whether *B* is on or off, the appearance of the block is the same.

When you desire to show the trick, you secretly tuck *B* between the roots of the first and second fingers of the right hand, convex side inward. Exhibiting *A*, you invite the company to assure themselves that it is just what it appears to be, a plain solid block of wood. When it is given back to you, you take it in the right hand. In so doing slip the little cap over its upper end, and show both together as being merely the block which has just been examined. You then take them in the left hand, small end uppermost, curling the thumb and forefinger round *B*, as seen in picture 2, but leaving it still visible, so that to the eye of the spectator the block as just seen is still in the hand. As a matter of fact, however, in withdrawing the right hand you carry off the block with it, and drop it into a convenient pocket. You now announce that although the block is made of boxwood, which is one of the hardest woods known, you can, by the aid of a little magic, compress it so as to reduce it to half its size, or even less. Suiting the action to the word, you bring your hands together and make a pretense of squeezing vigorously. Under cover of so doing, you insert the tip of the little finger of the right hand into the cap, which thenceforth remains on it, thimble fashion. Still keeping up the squeezing movement, you say: "It is getting smaller, smaller, smaller. I have made it so small that it has disappeared."



1. Pillar and cap.


2. Holding the cap.

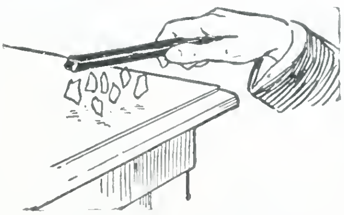
Opening the hands, you show that they are empty. The boxwood cap is, by artificial light, so nearly the color of the hand as to be practically invisible, and if the hand be kept in gentle motion the keenest eye will not detect its presence.

If the cap be found too loose a fit for the little finger, one of the other fingers may be used instead. The first attempts of the novice at practicing the trick will quickly show him what suits him best in this particular. The block and cap can be purchased for a small sum at any store where games and toys are sold.

ELECTRICITY AT HOME

THERE is magic in electricity and its marvelous powers. It is the most powerful and the most mysterious force in the world. Yet the knowledge of it is almost new. It is easy to push a button or press a knob up or down and so light up a room with electric light, but this has been possible only during the last twenty or thirty years. When our grandfathers were boys electric lighting was unknown.

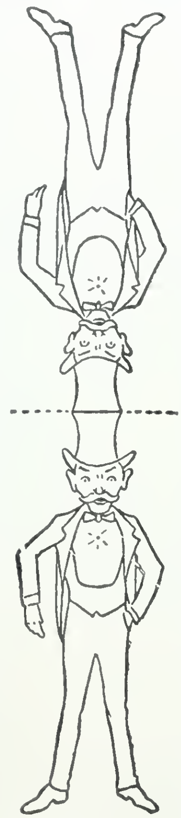
The experiments which made the powers of electricity known go back much farther, and it is about 150 years since Benjamin Franklin began to find out something about this mysterious power. Some of the methods he used were very simple, and any boy can try them for himself.



1. Exciter picking up paper.

Take a piece of ordinary brown paper and warm it before the fire. When it is hot, lay it on the table and brush it briskly with a warm, dry clothes brush. You then pick it up quickly and hold it to the wall. You will find that the paper has become electrified and that it will cling to the wall. It clings because it is *electrified* and is attracting the wall to it. If you warm the paper and brush it as before, and then hold it over some little bits of lighter paper, the small pieces will fly up and cling to the electrified paper.

It is even possible to get sparks from electrified paper. Take a large sheet of stout drawing-paper, warm it till it is thoroughly dry, place it on a dry wooden table, and rub it very briskly with a piece of flannel. Then put a piece of metal—a watch-chain or a bunch of keys—in the middle and lift the paper off the table by two corners. If someone else puts his knuckle or finger to the metal, a bright spark will pass between his finger and the metal, which, however, he will not feel. If the weather and the paper are thoroughly dry, you may get a spark an inch long.



2. The rolling man.

But paper is not the best thing with which to make these experiments. For one reason, it will not retain electricity very long; and for another, it is not the easiest substance to electrify.

A piece of glass rod or tube is a better *exciter*, as we call anything electrified by rubbing. A solid rod is the better, and a druggist can sell us a piece for a few cents. To excite, or electrify, this we must rub it briskly with a piece of dry silk. Or we can take a stick of ordinary sealing wax, which must be rubbed with flannel.

A third kind of exciter, and a very good one, is a piece of vulcanite rubbed with flannel. Vulcanite is hard rubber, and fountain pens are generally made of it. So if we can get an old fountain pen it will do very well.

We take our glass rod, sealing wax, or fountain pen, and excite it by rubbing with the silk or flannel. Then we hold it near some tiny scraps of paper or bits of bran, and it will pick them up, as seen in picture 1.

We must be careful that everything is quite dry, and the articles must be warmed before the fire to make sure they are dry. All experiments with this kind of electricity will fail most disappointingly unless everything is warm and dry, including the weather. We shall find sometimes that the rod will pick up the paper, and afterward will not attract the same piece. This is because the little bit of paper has received a charge of electricity from the rod, and when two electrified bodies come together they repel one another if both are electrified with the same sort of electricity.

If the bodies are charged with opposite kinds of electricity they will attract one another. These two sorts of electricity are called *positive* and *negative* electricity. Glass rubbed with silk gives positive electricity, and sealing wax or vulcanite rubbed with flannel gives negative electricity.

Take a piece of thin paper—the white edge of a newspaper would do—and cut a strip, say, about 4 inches long and about 1 inch wide. Double it over and bring the two ends together. Now draw a man, as shown in picture 2, and cut it out, taking care not to cut the hat, so that the figure when folded along the dotted line will stand up. If you excite the glass rod and hold it near one side, the figure will roll over toward it. If you then hold the excited vulcanite or sealing wax at the other side, he will roll back that way, and so you can attract him all round the table.

Another experiment is to make a tiny ball of pith out of the centre of an elderberry stick. This pith is very light when it is dry, and can easily be made into a small ball about as big as a pea.

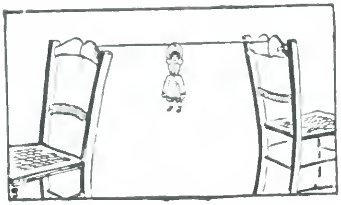
Fix the ball to a thread of silk, and the silk to the gas-bracket or something where it can hang down. Now excite the rod by rubbing and hold it near. The pith-ball will fly toward the rod, but after touching it it flies away again, and will keep off as long as the electricity remains in the rod. But if you have used the glass rod and then bring the vulcanite or sealing wax near, the ball will fly to it. This shows the difference between the two kinds of electricity.

In place of the pith-ball we can use a little piece of feather if we cannot get the pith, but pith is the better. Instead of hanging the pith-ball from a gas-bracket we can easily make a stand, as shown in picture 6. This is made of a bottle with a piece of copper wire stuck through the cork. We bend the wire over as shown, and make a loop in it to which to tie the silk thread.

With the pith-ball we can prove that when we rub the glass with silk, or the vulcanite or the sealing wax with flannel, the silk or the flannel also becomes electrified. If we roll the silk or flannel into a ball, and after rubbing the rod with it hold it near the pith-ball, the effect will be the same as if we held the rod near the ball.

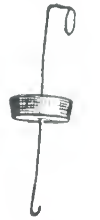
Take a piece of the white margin of a newspaper and draw a picture on it like picture 7, about 2 inches in height. Then cut it out to shape. Cut a small hole at the hands, but be careful to cut it round and clean. Make it big enough for the head of a pin to go through. Now take a piece of cotton thread and run one end through the hole in the paper acrobat.

Tie the ends of the cotton to two chairs or other objects, but see that the thread is drawn quite tight, as seen in picture 3. If you excite the rod you can make the paper acrobat swing round and round after the rod.

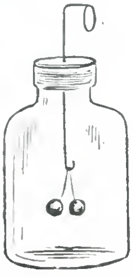


3. Ready for work.

The pith-ball electroscope is a contrivance which will be very useful in many electrical experiments, and it is easily made. With the electroscope you can always test the presence of electricity and make a good estimate of its strength. Take a glass pickle bottle with a big neck and clean and dry it thoroughly. Then put a piece of copper wire through the cork. You can do this if you make a hole in the cork with a skewer or a nail.



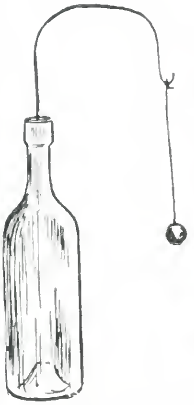
4. Cork and bent wire.



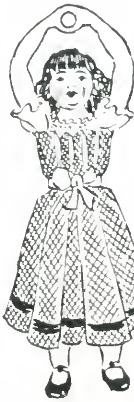
5. The electroscope.

The wire should be a little thicker than ordinary electric-bell wire. If you have to buy it, ask for No. 14, but any piece of fairly stiff copper wire will do. When you have put it through the cork, bend one end—the one to go *inside* the bottle—into a small hook-shape. The other end first has to be bent round like a ring, and then the ring must be bent down at a right angle. Then we shall have a piece like picture 4.

Now make two small pith-balls and hang them each on a piece of cotton, both pieces being of the same length. Tie the two ends to the hook in the wire and put them into the bottle and fix in the cork.



6. An easily made stand.



7. The acrobat.

The pith-balls should then be about two inches or three inches from the bottom of the bottle, as shown in picture 5.

Of course, you must not forget to see that the bottle and everything else is quite dry. If you excite the rod and touch the top of the wire with it, the two pith-balls will become excited; and, as both will be charged with the same sort of electricity, they will stand out apart from each other, and if you bring anything that is electrified against the copper wire you will see the pith-balls move.

We can make electricity on a larger scale than this. Borrow a lacquered wooden tray and cut out a piece of thick, heavy brown paper the same size as the inside of the tray, so that it lies flat on the bottom of the tray.

Gum two slips of paper at each end of the sheet to serve as handles. Have the tray supported on two dry glass tumblers—to prevent the electricity from leaking away—and warm the sheet of paper at the fire until it is thoroughly dry and hot. Rubbing will help to dry it. Then put it quickly on the table and brush it hard with a warm and dry stiff clothes brush. Put it on your tea tray which is resting on the tumblers, touch the tray with your finger, and lift away the sheet of paper by the handles you have fixed to it. Then put your knuckle close to the tray and you will get a spark, which you can get half a dozen times if you repeat the process of touching the tray, lifting away the brown paper, and putting your knuckle to the tray.

These experiments are the simplest you can undertake. But it was by such experiments that great inventors came to understand the mysterious powers of the force that makes possible the telephone and the telegraph, and the motors and dynamos that drive railway trains and street cars.

SIMPLE TESTS FOR COTTON, LINEN, WOOL AND SILK

THERE are times when children, as well as grown persons, desire to know whether a piece of material is made from cotton, linen, wool or silk. If you would like to be able to distinguish these materials by other than the feeling test, the following comparisons will aid you. Then, too, you will have lots of fun with these simple tests while you are finding out how to recognize the differences between the four materials.

First ask mother for threads of cotton, of linen, of silk and of wool (yarn). If any one of these is not at hand, you may make your own thread by unraveling a piece of cotton cloth or a piece of a new linen tablecloth, or a piece of good silk ribbon (satin will do), or a piece of wool cloth. In either case you will find out some interesting differences if you compare them. For example, break all four of the threads. The cotton and woolen threads will be found to break much more easily than the silk and linen ones. Now compare the broken ends. You will find that the cotton and wool threads have curly or fuzzy ends, but that the wool thread stretched a great deal while you were breaking it. If you will now untwist a piece of each of these threads you will note other differences as to the lustre, length, straightness and smoothness of the four fibres.

After you have compared these untwisted

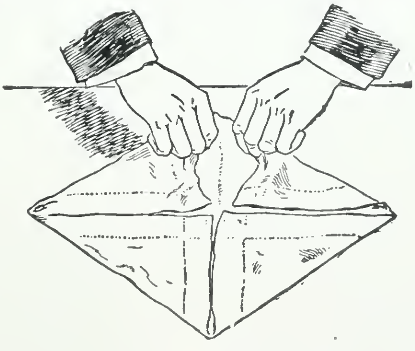
threads, further differences may be observed if they are then burned with a match. It will be found that while the cotton and linen burn so that stubby charred ends remain, the silk and wool leave a crust, and burn with an odor similar to that of burning feathers.

If you happen to be studying science at school, perhaps your teacher will help you to perform one or two chemical tests which are considered much more reliable. The sulphuric-acid test is made by placing pieces of cotton, wool, linen and silk cloth in a dish which contains enough sulphuric acid to cover parts of each piece. If desired, pieces of cloth which are part wool and part cotton or part cotton and part silk may likewise be placed in the acid solution. You will observe some interesting results. Watch especially those pieces which are affected most quickly. For example, the acid will destroy the silk and the cotton quickly, but will have little effect upon the wool. Be very careful in using acids.

Linen cloth is often combined with cotton, with the result that the properties of linen are lost and the only gain is in cheapness. For this reason it is well to know a few tests for linen. The best tests for linen are the tearing test, the oil test and the acid test. In the *tearing test*, the torn ends of linen appear unequal in length, parallel fibred and glossy. Cotton shows curling, lustreless threads of almost equal length. With practice it is possible to distinguish the sounds resulting from tearing the two materials; linen being shrill and cotton dull or muffled. In the *oil test*, a piece of linen is freed from dressing by boiling in water or in a solution of soda. It is then saturated with oil and laid upon a glass and covered with a smaller piece of glass. All the surplus oil is now removed from the edges of the cover glass, and the air bubbles are forced from the cloth. The cloth is now examined by letting the light fall upon the piece of cloth and by allowing the light to shine through it. When the light falls upon it, dark spots like grease spots on paper appear, but when held between the person and the light the linen cloth appears transparent. The opposite is true of cotton. In the *acid test*, a piece of linen which has been thoroughly washed and is perfectly dry is immersed in concentrated sulphuric acid for several minutes. It is then washed in water and dried between two pieces of blotting-paper. The cotton threads will dissolve almost completely, while the linen fibres remain nearly unaffected.

THE DISAPPEARING QUARTER

THIS is a capital trick. Two things only are wanted for it—a handkerchief spread out upon the table, and a quarter laid in the middle of it. The corners of the handkerchief are folded down over the coin, and anyone is permitted to feel that it is still there. And yet, at the conjurer's command, it passes through handkerchief and table, and is found on the floor beneath. The handkerchief is shaken out and proves to be empty. This trick is good enough to make quite a reputation for the youthful wizard, and yet it is simplicity itself—when you know how it is done.



In the first place, you must have two quarters in appearance as nearly alike as possible. Take an opportunity beforehand quietly to drop one of these under the table at which you propose to perform the trick. The only other thing required is a little pellet of beeswax the size of a peppercorn. This you must knead between the fingers till it is fairly soft, and then press—till needed in another sense—against the hinder part of the lowest button of your vest.

To perform the trick, take the wax off the button, and press it against one corner of the handkerchief which you are going to use. Then lay the handkerchief on the table squarely in front of you, with the waxed corner nearest to the right hand. Lay the quarter on the centre of the handkerchief, or, better still, let somebody else do this, to prove that there is "no deception." Then fold down the corners of the handkerchief one by one over the coin, beginning with the waxed corner, and pressing this down a little, so as to make it adhere. This done, ask someone to make sure, by feeling through the handkerchief, that the coin is still there. Each person who does so presses the wax a little closer.

Now comes the exciting moment. "Now, ladies and gentlemen," you say, "I am going to make the quarter pass right through the table on to the floor. If you will all be very quiet, perhaps you will hear it fall." They won't, but they may as well imagine that they do so. Their imagination helps the conjurer.

We blow upon the centre of the handkerchief, saying, "Presto, pass!" Then, hooking the first and second fingers of each hand inside the nearer opening of the handkerchief, as shown in the picture, we draw the two corners smartly apart, one in each hand, and shake it out. The coin, adhering to the handkerchief, is drawn into the right hand. "Look under the table, and see whether it has gone through," you say, and while general attention is occupied by looking for and picking up the other coin, you will have ample opportunity to get rid of the one in the hand.

Of course we are not bound to make the coin pass "through the table." If we prefer it, we may order it to pass under a candlestick, into a vase on the mantelpiece, or even into somebody's breast-pocket. All that is needful is to place the duplicate quarter where we intend that it shall be found, and alter the command accordingly.

THE GAME OF ZOO-GUESS

EVERYONE at a party was trying to think what a "Zoo-guess" could be, when the door opened and a maid brought in a big board with two sheets of white paper pinned to it. She placed the board on two chairs at one end of the room. At the other end Etta's mother sat at a table, and in front of her the children saw a bundle of little pink envelopes.

"First," the mother explained, "every boy must choose a partner.

"Now," she said, "I want two couples to come first. The boys will take these two black chalks, and they will stand by the board. The girls will stand by me at the table. I shall give them each an envelope, and when I say 'Go' they must run to their partners and give them the envelopes. The boys will open the envelopes, and they will find pieces of paper inside with the names of animals written on them. Then, as quickly as possible, they must try to draw the animals on paper, while their partners watch. The moment the girls can tell what the boys are trying to draw, they must run to me and tell me what the animals are meant for, and the girl who gets to me first will win a prize."

Then the fun began.

Two boys, with the black chalks ready, stood by the board, and their two girl partners stood at the table.

Etta's mother gave each girl an envelope, and said: "Now run as quickly as you can, and remember that the girl who gets back to me first wins." Then she called out: "One, two, three—go!"

Both girls ran as hard as they could down the room till they reached the boys. Then they gave up the envelopes, which the boys tore open as fast as they could.

All the other children were excited now, and leaned forward to watch.

The boys read the names of the animals on the pieces of paper they found in the envelopes and then tried to draw them.

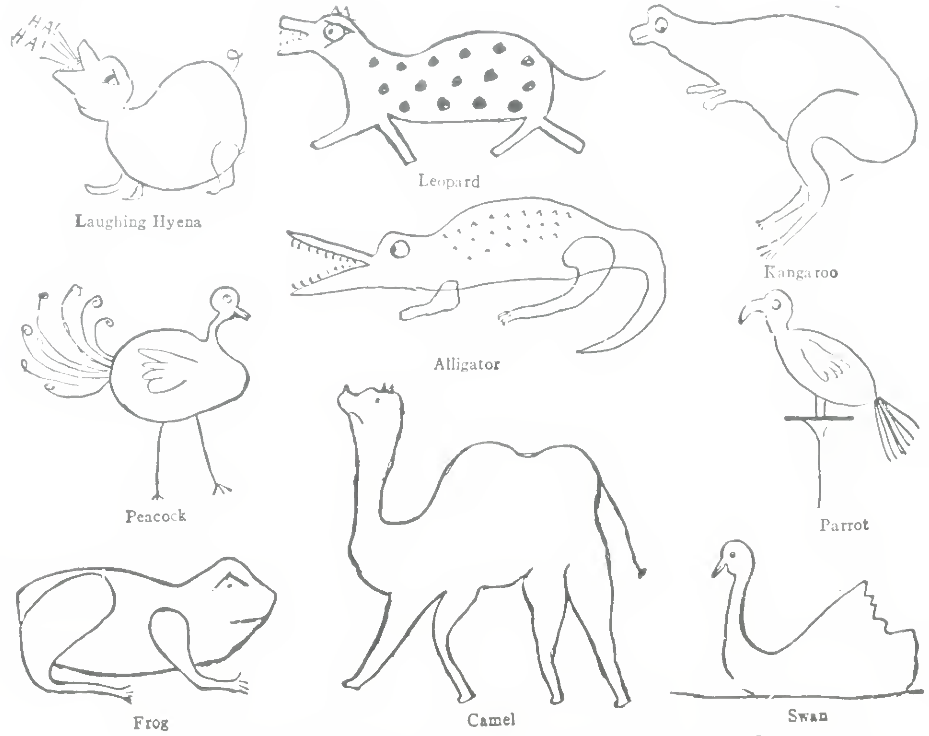
At first they only made marks that did not seem to mean anything.

Then one of the girls saw a curly line that looked something like an elephant's trunk, and, without waiting for anything more, she rushed back to Etta's mother at the table and said: "It's an elephant."

"Wrong! Go and look again."

The girl ran back and looked again at the queer thing her partner was trying to draw. She saw now that the curly line she had mistaken for a trunk was meant for a swan's neck, but before she could run back the other girl had managed to guess what her partner was drawing, and so won.

Of course they made mistakes, because they were so anxious to tell Etta's mother what the animals were, and so win a prize, that they never waited for the drawing to be finished, but began to guess the moment they saw a beak or a tail.



Laughing Hyena

Leopard

Kangaroo

Alligator

Peacock

Parrot

Frog

Camel

Swan

SOME OF THE ANIMALS THE CHILDREN HAD TO GUESS

THE NEXT THINGS TO MAKE AND TO DO ARE ON PAGE 2041.

THE STORY OF A BOY'S HEROISM

HOLLAND is a land where the people have continually to keep watch on the sea, as parts of the country are below the level of the water when it is high tide. In order to keep the sea from flooding the land, great banks of sand and other material were built in these parts of the country. These banks, or dykes, as they are called—in America a "dyke" is a ditch—had to be kept in constant repair. The poem tells how a little boy managed to stop a hole in a dyke and thus prevented the sea from flooding the land. The writer of the poem was an American author named Phœbe Cary, who was born in Ohio in the year 1824 and was for many years very popular in America.

THE LEAK IN THE DYKE

THE good dame looked from her cottage
At the close of the pleasant day,
And cheerily called to her little son
Outside the door at play:
"Come, Peter, come! I want to see you go,
While there is light to see,
To the hut of the blind old man who lives
Across the dyke, for me;
And take these cakes I made for him—
They are hot and smoking yet.
You have time enough to go and come
Before the sun is set."

Then the good wife turned to her labour,
Humming a simple song,
And thought of her husband working hard
At the sluices all day long;
And set the turf a-blazing,
And brought the coarse black bread,
That he might find a fire at night,
And find the table spread.

And Peter left the brother
With whom all day he had played,
And the sister who had watched their sports
In the willow's tender shade;
And told them they'd see him back before
They saw a star in sight,
Though he wouldn't be afraid to go
In the very blackest night!

For he was a brave, bright fellow,
With eye and conscience clear;
He could do whatever a boy might do,
And he had not learned to fear.
Why, he wouldn't have robbed a bird's nest,
Nor brought a stork to harm,
Though never a law in Holland
Had stood to stay his arm!

And now, with his face all glowing,
And eyes as bright as the day
With the thoughts of his pleasant errand,
He trudged along the way.
And soon his joyous prattle
Made glad a lonesome place—
Alas! if only the blind old man
Could have seen that happy face!
Yet he, somehow, caught the brightness
Which his voice and presence lent;
And he felt the sunshine come and go
As Peter came and went.

And now, as the day was sinking,
And the winds began to rise,
The mother looked from her door again,
Shading her anxious eyes;
And saw the shadows deepen,
And birds to their homes come back;
And never a sign of Peter
Along the level track.
But she said: "He will come at morning,
So I need not fret or grieve—
Though it isn't like my boy at all
To stay without my leave."

But where was the child delaying?
On the homeward way was he,
And across the dyke while the sun was up
An hour above the sea.
He was stooping now to gather flowers,
Now listening to the sound,
As the angry waters dashed themselves
Against their narrow bound.
"Ah! well for us," said Peter,
"That the gates are good and strong,
And my father tends them carefully,
Or they would not hold you long!
You're a wicked sea," said Peter;
"I know why you fret and chafe;
You would like to spoil our lands and homes,
But our sluices keep you safe!"

But hark! Through the noise of the waters
Comes a low, clear, trickling sound;
And the child's face pales with terror,
And his blossoms drop to the ground.
He is up the bank in a moment,
And, stealing through the sand,
He sees a stream not yet so large
As his slender, childish hand.
'Tis a leak in the dyke! He is but a boy,
Unused to fearful scenes;
But, young as he is, he has learned to know
The dreadful thing that means.
A leak in the dyke! The stoutest heart
Grows faint that cry to hear,
And the bravest man in all the land
Turns white with mortal fear:
For he knows the smallest leak may grow
To a flood in a single night;
And he knows the strength of the cruel sea
When loosed in its angry might.

And the boy! he has seen the danger,
And, shouting a wild alarm,
He forces back the weight of the sea
With the strength of his single arm!
He listens for the joyful sound
Of a footstep passing nigh;
And he lays his ear to the ground to catch
The answer to his cry.

And he hears the rough wind blowing,
And the waters rise and fall,
But never an answer came to him,
Save the echo of his call.
He sees no hope, no succour—
His feeble voice is lost;
Yet what shall he do but watch and wait,
Though he perish at his post!

So, faintly calling and crying
Till the sun is under the sea,
Crying and moaning till the stars
Come out for company.
He thinks of his brother and sister,
Asleep in their safe, warm bed;
He thinks of his father and mother,
Of himself as dying and dead,
And of how, when the night is over,
They must come and find him at last;
But he never thinks he can leave the place
Where duty holds him fast.

The good dame in the cottage
Is up and astir with the light,
For the thought of her little Peter
Has been with her all night.
And now she watches the pathway,
As yestereve she had done;
But what does she see so strange and black
Against the rising sun?
Her neighbours are bearing between them
Something straight to her door—
The child is coming home, but not
As he ever came before!

"He is dead!" she cries. "My darling!"
And the startled father hears,
And comes and looks the way she looks,
And fears the thing she fears.
Till a glad shout from the bearers
Thrills the stricken man and wife:
"Give thanks, for your son has saved our land,
And God has saved his life!"
So, there in the morning sunshine,
They knelt about the boy;
And every head was bared and bent
In tearful, reverent joy.

'Tis many a year since then; but still,
When the sea roars like a flood,
Their boys are taught what a boy can do
Who is brave, and true, and good.
For every man in that country
Takes his son by the hand,
And tells him of little Peter,
Whose courage saved the land.

They have many a valiant hero,
Remembered through the years;
But never one whose name so oft
Is named with loving tears.
And his deed shall be sung by the cradle,
And told to the child on the knee,
So long as the dykes of Holland
Divide the land from the sea!

MY SHIPS*

This poem was written by Ella Wheeler Wilcox, an American poet. She was a busy writer for the papers in New York, but she wrote many poems for adult readers and some really fine verses for young folk. My Ships is a charming poem which young and old alike will much appreciate.

If all the ships I have at sea
Should come a-sailing home to me,
Ah, well! the harbour could not hold
So many sails as there would be
If all my ships came in from sea.

If half my ships came home from sea
And brought their precious freight to me,
Ah, well! I should have wealth as great
As any king who sits in state;
So rich the treasures that would be,
In half my ships now out at sea.

If just one ship I have at sea
Should come a-sailing home to me,
Ah, well! the storm-clouds then might frown;
For if the others all went down,
Still rich and proud and glad I'd be
If that one ship came back to me.

If that one ship went down at sea,
And all the others came to me,
Weighed down with gems and wealth untold,
With glory, honours, riches, gold,
The poorest soul on earth I'd be,
If that one ship came not to me.

O skies, be calm! O winds, blow free—
Blow all my ships safe home to me!
But if thou sendest some a-wrack,
To never more come sailing back,
Send any—all that skim the sea,
But bring my love-ship home to me.

THE CHARGE OF THE LIGHT BRIGADE

The charge of the Light Brigade took place at the battle of Balaclava on October 25, 1854, in the war with Russia. It was the result of a mistaken order from a commanding officer, and in twenty-five minutes more than two-thirds of the soldiers had been killed or wounded. Lord Tennyson, in this famous poem, has given deathless fame to the brave soldiers who went forward fearless in obedience to command, although they knew they were going to almost certain death.

Half a league, half a league,
Half a league onward,
All in the valley of Death
Rode the six hundred.
"Forward, the Light Brigade!
Charge for the guns!" he said;
Into the valley of Death
Rode the six hundred.

"Forward, the Light Brigade!"
Was there a man dismay'd?
Not tho' the soldiers knew
Someone had blunder'd:
Theirs not to make reply,
Theirs not to reason why,
Theirs but to do and die:
Into the valley of Death
Rode the six hundred.

Cannon to right of them,
Cannon to left of them,
Cannon in front of them
Volley'd and thunder'd;

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*From Poems of Power, copyright, 1908, by Ella Wheeler Wilcox. By special permission of the publishers, W. B. Conkey Company, Hammond, Indiana.

Storm'd at with shot and shell,
Boldly they rode and well,
Into the jaws of Death,
Into the mouth of Hell
Rode the six hundred.

Flash'd all their sabres bare,
Flash'd as they turn'd in air,
Sabring the gunners there,
Charging an army, while
All the world wonder'd:
Plunged in the battery-smoke,
Right thro' the line they broke;
Cossack and Russian
Reel'd from the sabre-stroke,
Shatter'd and sunder'd.
Then they rode back, but not—
Not the six hundred.

Cannon to right of them,
Cannon to left of them,
Cannon behind them
Volley'd and thunder'd;
Storm'd at with shot and shell,
While horse and hero fell,
They that had fought so well
Came thro' the jaws of Death,
Back from the mouth of Hell,
All that was left of them,
Left of six hundred.

When can their glory fade?
O the wild charge they made!
All the world wonder'd.
Honour the charge they made!
Honour the Light Brigade,
Noble six hundred!

COUNSEL TO GIRLS

This pretty little poem is by Robert Herrick, a well-known English poet of the sixteenth century, and has been set to music.

GATHER ye rosebuds while ye may,
Old Time is still a-flying:
And this same flower that smiles to-day,
To-morrow will be dying.

The glorious lamp of Heaven, the sun,
The higher he's a-getting
The sooner will his race be run,
And nearer he's to setting.

That age is best which is the first,
When youth and blood are warmer;
But being spent, the worse, and worst
Times, still succeed the former.

Then be not coy, but use your time;
And while ye may, go marry;
For having lost but once your prime,
You may for ever tarry.

TEARS, IDLE TEARS

The following poem by Alfred Tennyson is selected from The Princess, and has a wonderful beauty and pathos all its own.

TEARS, idle tears, I know not what they mean.
Tears from the depth of some divine despair
Rise in the heart, and gather to the eyes,
In looking on the happy autumn fields,
And thinking of the days that are no more.

Fresh as the first beam glittering on a sail,
That brings our friends up from the under world;
Sad as the last which reddens over one
That sinks with all we love below the verge—
So sad, so fresh, the days that are no more.

Ah, sad and strange as in dark autumn dawns
The earliest pipe of half-awaken'd birds
To dying ears, when into dying eyes
The casement slowly grows a glimmering square;
So sad, so strange, the days that are no more.

Dear as remember'd kisses after death,
And sweet as those by hopeful fancy feign'd
On lips that are for others; deep as love,
Deep as first love, and wild with all regret—
O death in life, the days that are no more.

A MUSICAL INSTRUMENT

A Musical Instrument is considered one of the finest poems of the English poet Elizabeth Barrett Browning, and points out the fact that nothing that is worth while in this world is accomplished without its sacrifice and pain.

WHAT was he doing, the great god Pan,
Down in the reeds by the river?
Spreading ruin and scattering ban,
Splashing and paddling with hoofs of a goat,
And breaking the golden lilies afloat
With the dragon-fly on the river.

He tore out a reed, the great god Pan,
From the deep, cool bed of the river:
The limpid water turbidly ran,
And the broken lilies a-dying lay,
And the dragon-fly had fled away,
Ere he brought it out of the river.

High on the shore sat the great god Pan,
While turbidly flow'd the river;
And hack'd and hew'd as a great god can
With his hard bleak steel at the patient reed,
Till there was not a sign of a leaf indeed
To prove it fresh from the river.

He cut it short, did the great god Pan
(How tall it stood in the river!),
Then drew the pith, like the heart of a man,
Steadily from the outside ring,
And notch'd the poor dry empty thing
In holes, as he sat by the river.

"This is the way," laugh'd the great god Pan
(Laugh'd while he sat by the river),
"The only way, since gods began
To make sweet music, they could succeed."
Then dropping his mouth to a hole in the reed,
He blew in power by the river.

Sweet, sweet, sweet, O Pan!
Piercing sweet by the river!
Blinding sweet, O great god Pan!
The sun on the hill forgot to die,
And the lilies revived, and the dragon-fly
Came back to dream on the river.

Yet half a beast is the great god Pan,
To laugh as he sits by the river,
Making a poet out of a man:
The true gods sigh for the cost and pain—
For the reed which grows nevermore again
As a reed with the reeds in the river.

WEIGHING THE BABY

[illegible] is written by Ethel Lynn, and some of [illegible] own charm has crept into its verses.

HOW many pounds does baby weigh?
"Baby" who came a while ago;
How many pounds from crowning curl
To rosy point of the restless toe?
Nobody weighed the baby's smile,
Or the love that came with the helpless one;
Nobody weighed the threads of care
From which a human life is spun.
Nobody weighed the baby's soul,
For here on earth no weights there be
That could avail; God only knows
Its value through eternity.
O mother, sing your merry note!
O father, laugh but don't forget
From baby's eyes looks out a soul
To be in Eden's light reset!

THE HAPPIEST LAND

The poet Longfellow has adapted the following ballad from a German original. It illustrates the vanity of earthly joys.

THERE sat one day in quiet,
By an alehouse on the Rhine,
Four hale and hearty fellows
And drank the precious wine.

The landlord's daughter filled their cups,
Around the rustic board;
Then sat they all so calm and still,
And spake not one rude word.

But when the maid departed,
A Swabian raised his hand,
And cried, all hot and flushed with wine,
"Long live the Swabian land!

"The greatest kingdom upon earth
Cannot with that compare;
With all the stout and hardy men,
And the nut-brown maidens there."

"Ha!" cried a Saxon, laughing—
And dashed his beard with wine—
"I had rather live in Lapland,
Than that Swabian land of thine!

"The goodliest land on all this earth,
It is the Saxon land!
There have I as many maidens
As fingers on this hand!"

"Hold your tongues! both Swabian and Saxon!"
A bold Bohemian cries;
"If there's a heaven upon this earth,
In Bohemia it lies.

"There the tailor blows the flute,
And the cobbler blows the horn,
And the miner blows the bugle,
Over mountain gorge and bourn."

And then the landlord's daughter
Up to Heaven raised her hand,
And said, "Ye may no more contend—
There lies the happiest land!"

THE RETIRED CAT

William Cowper, the gentle and observant poet of domestic life, though not often given to humor, has a sly touch of that quality in this charming poem about his cat, which got shut in a drawer, and by doing so gave its master an opportunity to point an excellent moral not only for cats but for all of us

A POET'S cat, sedate and grave,
As poet well could wish to have,
Was much addicted to inquire
For nooks to which she might retire,
And where, secure as mouse in chink,
She might repose, or sit and think.
Sometimes ascending, debonair,
An apple-tree, or lofty pear,
Lodged with convenience in the fork,
She watch'd the gardener at his work;
Sometimes her ease and solace sought
In an old empty watering-pot;
There, wanting nothing save a fan
To seem some nymph in her sedan,
Apparel'd in exactest sort,
And ready to be borne to court.

But love of change it seems has place
Not only in our wiser race;
Cats also feel, as well as we,
That passion's force, and so did she.
Her climbing, she began to find,
Exposed her too much to the wind,
And the old utensil of tin
Was cold and comfortless within.
She therefore wish'd, instead of those,
Some place of more serene repose,
Where neither cold might come, nor air
Too rudely wanton with her hair;
And sought it in the likeliest mode
Within her master's snug abode.

A drawer, it chanced, at bottom lined
With linen of the softest kind,
With such as merchants introduce
From India, for the ladies' use—
A drawer impending o'er the rest
Half open, in the topmost chest,
Of depth enough, and none to spare,
Invited her to slumber there.
Puss, with delight beyond expression,
Survey'd the scene and took possession.
Recumbent at her ease, ere long,
And lull'd by her own hum-drum song,
She left the cares of life behind,
And slept as she would sleep her last;
When in came, housewifely inclined,
The chambermaid, and shut it fast,
By no malignity impelled,
But all unconscious whom it held.

Awaken'd by the shock, cried Puss,
"Was ever cat attended thus!
The open drawer was left, I see
Merely to prove a nest for me;
For soon as I was well composed,
Then came the maid, and it was closed.
How smooth these kerchiefs, and how sweet!
Oh, what a delicate retreat!
I will resign myself to rest
Till Sol, declining in the west,
Shall call to supper, when no doubt,
Susan will come and let me out."

The evening came, the sun descended,
And Puss remain'd still unattended.
The night roll'd tardily away,
(With her, indeed, 'twas never day),

The sprightly morn her course renew'd,
The evening grey again ensued;
And Puss came in to mind no more
Than if entomb'd the day before.
With hunger pinch'd, and pinch'd for room,
She now presaged approaching doom,
Nor slept a single wink or purr'd,
Conscious of jeopardy incurr'd.

That night, by chance, the poet, watching,
Heard an inexplicable scratching;
His noble heart went pit-a-pat,
And to himself he said: "What's that?"
He drew the curtain at his side,
And forth he peep'd, but nothing spied;
Yet, by his ear directed, guess'd
Something imprison'd in the chest,
And, doubtful what, with prudent care
Resolved it should continue there.
At length a voice which well he knew,
A long and melancholy mew,
Saluting his poetic ears,
Consoled him and dispell'd his fears.
He left his bed, he trod the floor,
And 'gan in haste the drawers explore,
The lowest first, and without stop
The rest in order, to the top;
For 'tis a truth well known to most:
That whatsoever thing is lost,
We seek it, ere it come to light,
In every cranny but the right.
—Forth skipp'd the cat, not now replete,
As erst, with airy self-conceit,
Nor in her own fond apprehension
A theme for all the world's attention:
But modest, sober, cured of all
Her notions hyperbolical,
And wishing for a place of rest
Anything rather than a chest.
Then stepp'd the poet into bed
With this reflection in his head:

Moral

Beware of too sublime a sense
Of your own worth and consequence!
The man who dreams himself so great,
And his importance of such weight,
That all around, in all that's done,
Must move and act for him alone,
Will learn in school of tribulation,
The folly of his expectation.

TOM BOWLING

This song by Charles Dibdin is one of the most popular of sea songs, and deservedly so, for its pure and simple pathos.

HERE, a sheer hulk, lies poor Tom Bowling,
  The darling of our crew;
No more he'll hear the tempest howling,
  For death has broach'd him to.
His form was of the manliest beauty,
  His heart was kind and soft;
Faithful, below, he did his duty;
  But now he's gone aloft.

Tom never from his word departed,
  His virtues were so rare.
His friends were many and true-hearted,
  His Poll was kind and fair:
And then he'd sing, so blithe and jolly,
  Ah, many's the time and oft!
But mirth is turn'd to melancholy,
  For Tom is gone aloft.

Yet shall poor Tom find pleasant weather,
  When he, who all commands,
Shall give, to call life's crew together,
  The word to pipe "all hands."
Thus Death, who kings and tars despatches,
  In vain Tom's life has doff'd:
For though his body's under hatches,
  His soul has gone aloft.

THE OFFICER'S GRAVE

Henry Francis Lyte, the author of the following poem, was born near Kelso in 1793 and died in the south of France in 1847. He was a clergyman and wrote many hymns sung in all the churches, the best known of these being Abide with Me.

THERE is in the wide, lone sea
  A spot unmark'd, but holy;
For there the gallant and the free
  In his ocean-bed lies lowly.

Down, down, within the deep
  That oft to triumph bore him,
He sleeps a sound and pleasant sleep
  With the salt waves dashing o'er him.

He sleeps serene and safe
  From tempest or from billow,
Where the storms that high above him chafe
  Scarce rock his peaceful pillow.

The sea and him in death,
  They did not dare to sever;
It was his home while he had breath:
  'Tis now his rest for ever!

Sleep on, thou mighty dead!
  A glorious tomb they've found thee;
The broad blue sky above thee spread:
  The boundless waters round thee.

O GOD, OUR HELP IN AGES PAST

This beautiful hymn by Dr. Isaac Watts, first published in his Psalms of David in 1719, is generally regarded as the finest he has written. In its original form it consisted of nine verses, but has since been reduced to six. Charles Wesley, the brother of the great man who founded the Methodist Church, altered the hymn in several parts, and changed the first line to "O God, our help in ages past." This form is retained in most of the present-day collections of hymns, and is here given.

O GOD, our help in ages past,
  Our hope for years to come,
Our shelter from the stormy blast
  And our eternal home.

Beneath the shadow of Thy throne
  Thy saints have dwelt secure,
Sufficient is Thine arm alone,
  And our defence is sure.

Before the hills in order stood,
  Or earth received her frame,
From everlasting Thou art God,
  To endless years the same.

A thousand ages in Thy sight
  Are like an evening gone:
Short as the watch that ends the night
  Before the rising sun.

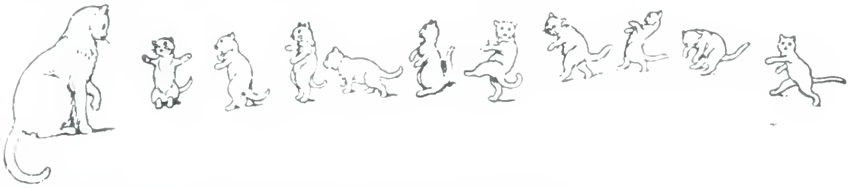
Time, like an ever-rolling stream,
  Bears all its sons away;
They fly forgotten as a dream
  Dies at the opening day.

O God, our help in ages past,
  Our hope for years to come,
Be Thou our guard while troubles last
  And our eternal home

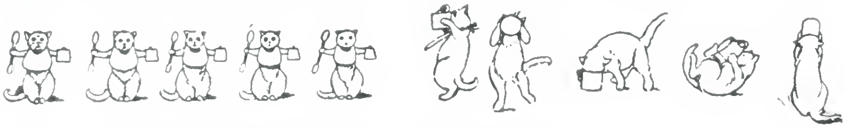
LITTLE VERSES FOR VERY LITTLE PEOPLE

THE CAT'S TEA-PARTY

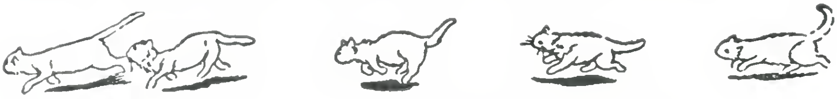
FIVE little pussy-cats, invited out to tea,
Cried, "Mother, let us go. Oh, do! for good we'll surely be!
We'll wear our bibs and hold our things as you have shown us how—
Spoons in right paws, cups in left—and make a pretty bow;
We'll always say, 'Yes, if you please,' and 'Only half of that!' "
"Then go, my darling children," said the happy mother cat.



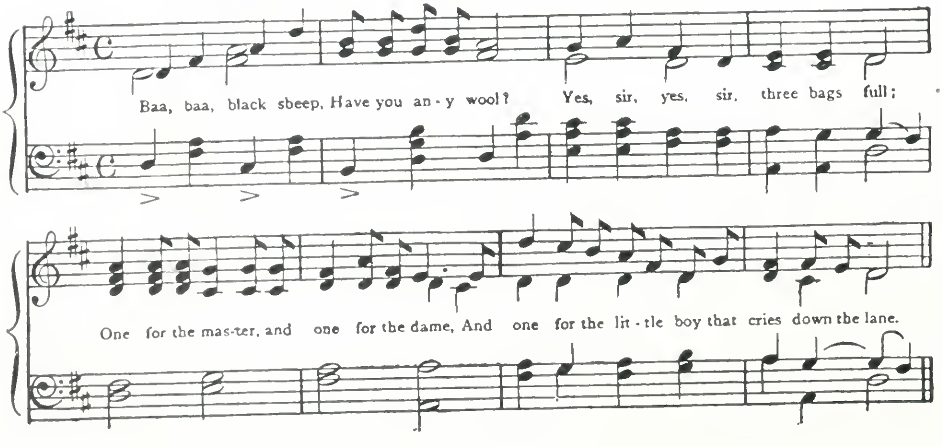
The five little pussy-cats went out that night to tea,
Their heads were smooth and glossy, their tails were swinging free;
They held their things as they had learned, and tried to be polite—
With snowy bibs beneath their chins they were a pretty sight.

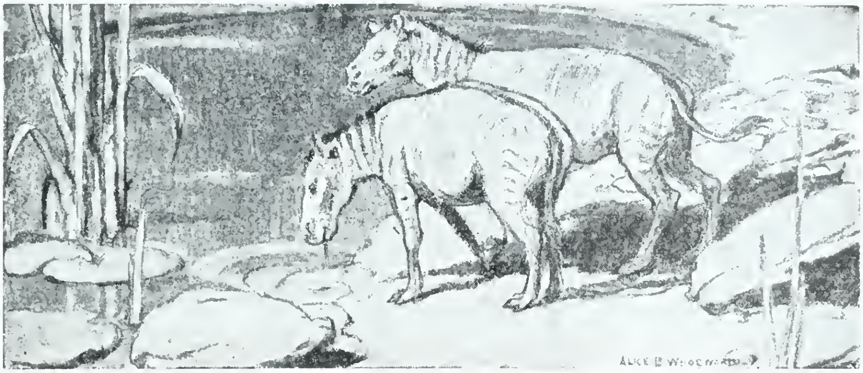


But, alas! for manners beautiful and coats as soft as silk,
The moment that the little kits were asked to take some milk
They dropped their spoons, forgot to bow, and—oh, what do you think?
They put their noses in their cups, and all began to drink!
Yes, every naughty little kit set up a meow for more,
They knocked the teacups over, and scampered through the door!



BAA, BAA, BLACK SHEEP


Baa, baa, black sheep, Have you an-y wool? Yes, sir, yes, sir, three bags full;
One for the mas-ter, and one for the dame, And one for the lit-tle boy that cries down the lane.



The hyracotherium of the Eocene Period.

THE EOCENE PERIOD

THOUGH there is no hard-and-fast line to be drawn between the various geological periods, the rocks of the Eocene, like those of the Triassic, show such distinct changes in both life and rocks that it is proper to regard them as the beginning of a new era. In most parts of the world there is quite an abrupt transition from the conditions of the Cretaceous to the conditions of the Eocene.

Between the laying-down of the Cretaceous and the Eocene rocks tremendous geological changes took place. The Cretaceous rocks, during the greater part of the Cretaceous Period, were under water, some of them under the deep sea; but in the Eocene, they, with all their lagoons, estuaries, lakes and seas, were generally raised into land and mountains. And not only were the chalky and sandy and clayey deposits of the Cretaceous raised above the sea into such masses as the cliffs of Dover, but even the floor of the ancient Tertiary Sea, full of nummulites, was forced up sometimes as high as 16,000 or 17,000 feet. It must have been a stupendous upheaval of the earth's crust, for it took place all over the world.

When the Eocene deposits began to form, we find that not only was the face of the world completely changed, but its plant and animal life was unlike those of preceding periods. It is for this reason that the period has been called the Eocene, from the Greek word *eos* meaning "dawn," and it has been regarded as the beginning of a new system, which has been named the Tertiary. It was the dawn of the world as we now know it. There are rocks, chiefly in Europe, between the Cretaceous and the Eocene called "Palæocene," meaning "Old Eocene."

Eocene rocks are found all over the world, but chiefly in the Pyrenees, the Alps, the Carpathians, the Caucasus, Asia Minor, Northern Africa, Persia, Baluchistan, the Sulaiman Mountains, China and Japan. There the rocks are thousands of feet thick and consist chiefly of limestone made out of the shells of nummulites.

In Eastern North America the Eocene rocks stretch along the Atlantic from New Jersey into Texas. Parts of California, Washington and Oregon were also covered by shallow seas. In the interior there are large areas of Eocene rocks in Alberta, some in Saskatchewan, and in various parts of central and western United States. There were shallow lakes and marshes and much volcanic activity in this region.

The vegetation of the period was

very rich, and many of our common trees grew freely, as ashes, beeches, willows, poplars, elms and maples. Palms and bananas were also found. The climates of Greenland and Alaska were temperate, and luxuriant forests grew.

The animal life of the period was varied. Mammals, birds, reptiles, fishes, insects and molluscs were well represented. Among birds, snipes, seagulls, buzzards, hawks, ospreys, quails, pelicans, flamingoes and hornbills were common. But the most striking feature of the animal life then was the disappearance of the huge lizards of the former period and the appearance of new mammals.

TWO QUEER ANIMALS ALMOST AS LARGE AS ELEPHANTS

Two of the most extraordinary creatures living then were the Titanotheres and the Uintatheres. The former were large, some of them almost as large as elephants. Two great bony lumps grew out of the front of the skull, and the brain was hardly as large as your fist. The uintathere has not been found in England, nor even in Europe—only in America; but it is characteristic of the period. It was about as big as a small elephant, and it was armed with six horns, four above its nose and two above its ears. Small camels have also been found.

After the Eocene came the Oligocene, which is not very different from the Eocene. Oligocene rocks are not common east of the Mississippi except in the Gulf region. On the Pacific they are more common, and in the interior are large areas with many interesting fossils. The plants are generally like those of the Eocene, but the climate was cooler.

After the Oligocene came the Miocene. It is unrepresented in the rocks of England, but Miocene rocks are found in France, Belgium, Switzerland and in many other countries, and show a gradual progression in all forms of life, together with the production of many new forms. In Western North America Miocene rocks are widespread, but not very thick except on the Pacific coast.

THE SURGEON WHO DECEIVED THE WORLD OF SCIENCE

The most remarkable new animals were the Mastodon and the Dinotherium, both huge animals of the elephant family. The tusks of the mastodon were straight; and the tusks of the dinotherium turned downward. The first mastodon was discovered in 1613, and the history of its discovery is very curious, one of the rare examples of imposture in science.

The skeleton was found by some workmen in a sand quarry at Dauphiny, in France. Such bones had never been found before, and a surgeon called Mazuyer saw a chance of making a great sensation. He purchased the bones and then pretended that he had found them in a tomb 30 feet long and 15 feet broad, built of bricks, and bearing the inscription: "Teutobocchus Rex." He also stated that he had found fifty medals of Marius in the tomb; and there seemed no reason to doubt his good faith.

A barbarian king named Teutobocchus had actually invaded Gaul at the head of the Cimbri, had been defeated by the Roman Marius and led in triumph to Rome. According to tradition, Teutobocchus was so tall that he towered above all the trophies borne on lances in the triumphal procession. Mazuyer's story therefore fitted in with the legend and met with general acceptance. The giant formed out of the mastodon's bones was twenty-five feet long, and the skeleton was exhibited throughout France and Germany. Many people were rather skeptical, and a learned anatomist argued that the bones belonged to an elephant; but it was not till they were removed to the Museum of Natural History in Paris that the remains were definitely identified as the skeleton of a creature like an elephant, and the fraud was exposed.

The dinotherium found only in Europe was larger than either the mammoth or the mastodon, which have been found in both continents. It lived on herbage, and seems to have inhabited lakes, lagoons and estuaries.

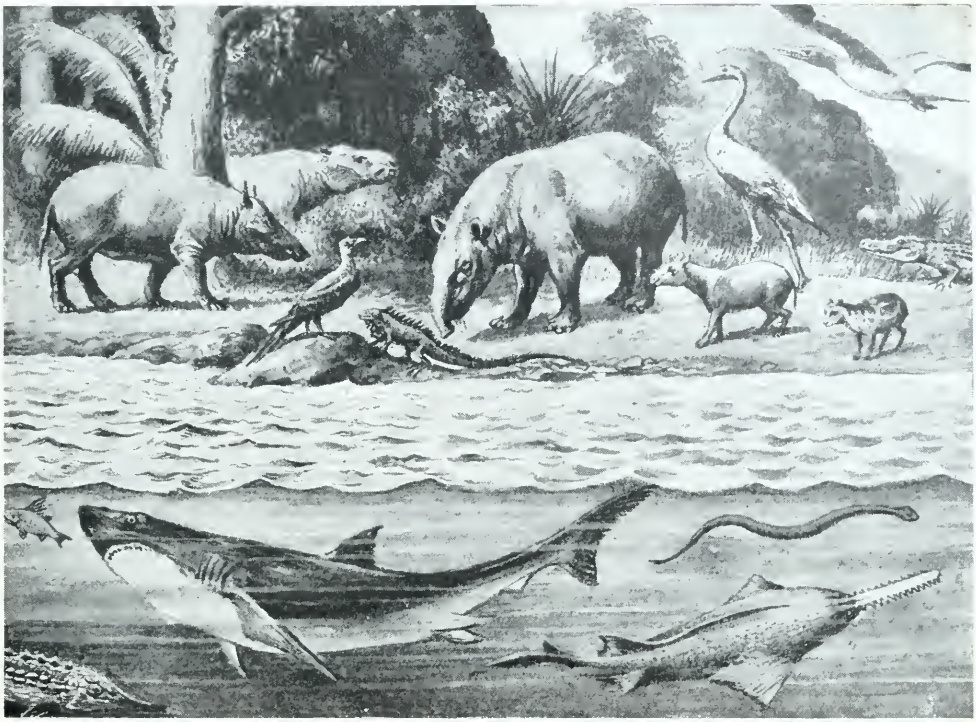
THE FIRST CATS AND HOGS APPEAR IN THE WORLD

In the Miocene also have been found the first cats, hogs and antelopes. Wolves, panthers and sabre-toothed tigers were common, and there were apes as large as a chimpanzee; but so far no remains of man have been found.

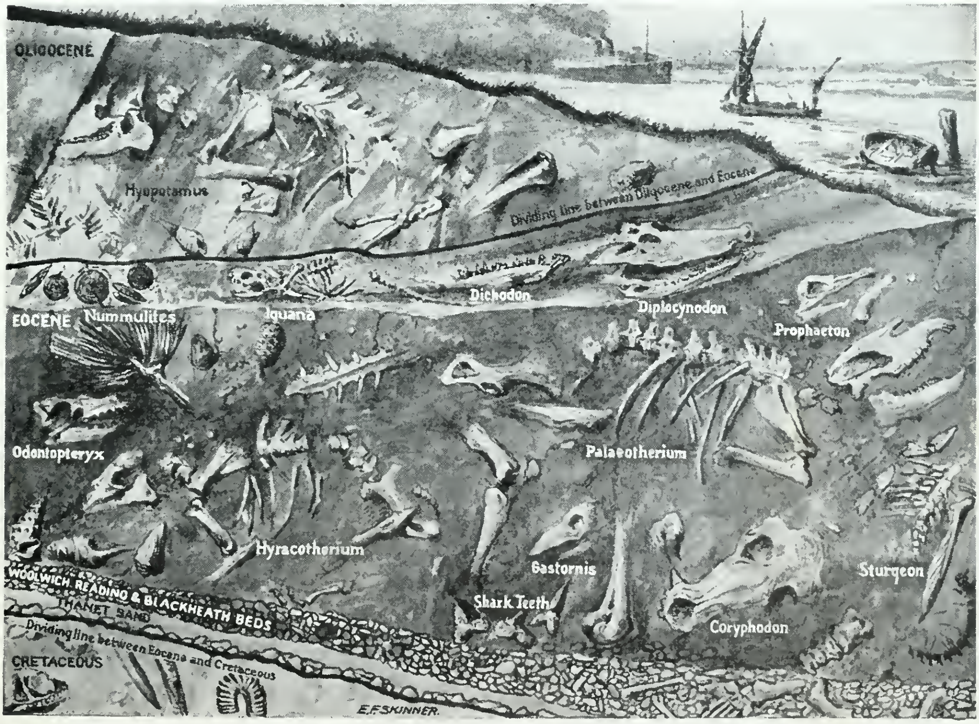
The whole Tertiary Period may be considered as the age of the mammal, as the Secondary Period was the age of the great lizards. In Miocene times there were bigger mammals—the dinotherium, the mammoth and the mastodon—than the world has ever seen since.

THE NEXT STORY OF THE EARTH IS ON PAGE 1925.

LIFE AND REMAINS OF THE EOCENE

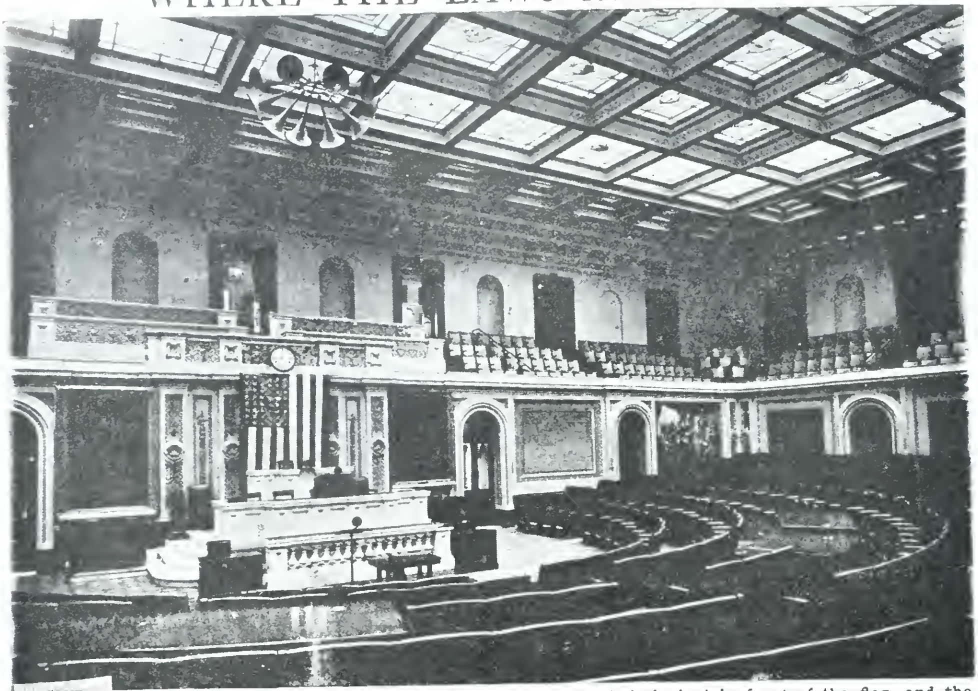


Scene in the Eocene, and some of the animals which then lived on land and water.

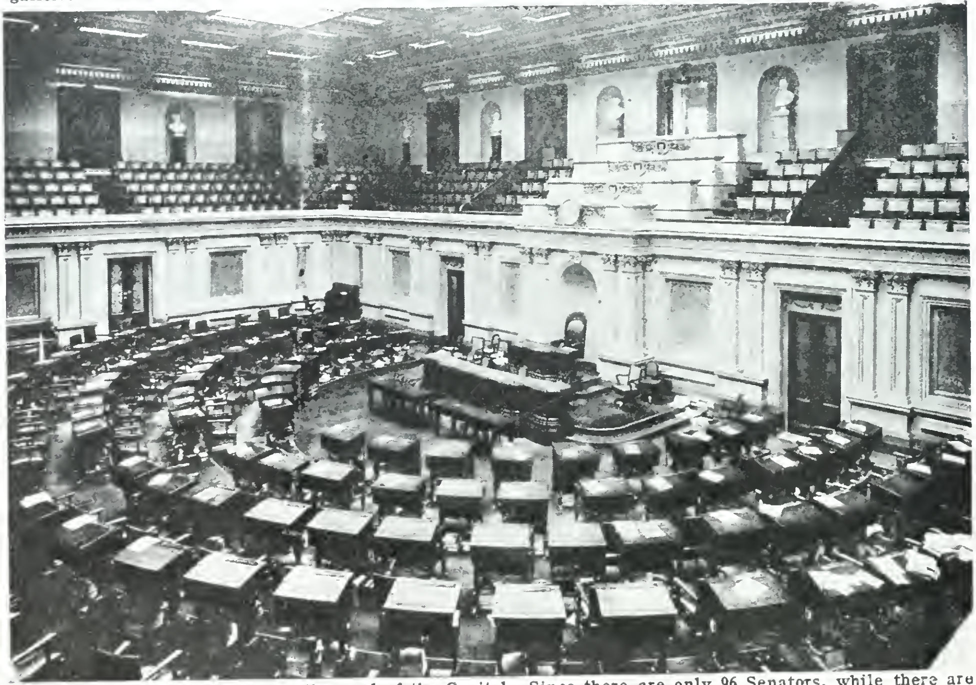

OLIGOCENE
Hyopotamus
Dividing line between Oligocene and Eocene
Dichodon
Diplocynodon
Prophaeton
EOCENE
Nummulites
Iguana
Odontopteryx
Palaeotherium
Hyracotherium
Gastornis
Sturgeon
Shark Teeth
Coryphodon
WOOLWICH, READING & BLACKHEATH BEDS
THANET SAND
Dividing line between Eocene and Cretaceous
CRETACEOUS
E.F.SKINNER.

Deposits of the Eocene and Oligocene epochs, with fossil remains.

WHERE THE LAWS ARE MADE



This is the hall of the House of Representatives. The Speaker's chair is just in front of the flag, and the clerks are immediately in front of him. The members sit in the semicircular rows of seats you see. The galleries extend all around the room, and some are open to the public. © Harris & Ewing.

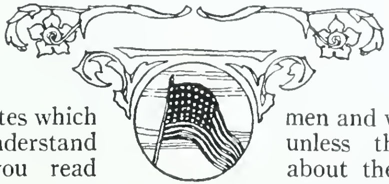


The Senate Chamber is at the other end of the Capitol. Since there are only 96 Senators, while there are 435 Representatives, there is room to allow each Senator to have a separate desk. The Vice-President is the presiding officer of the Senate, and his chair is in the recess under the clock. Both chambers are lighted entirely from above both day and night. © Harris & Ewing, from Wide World Photos.

THE HISTORY OF THE UNITED STATES

WE are giving in this section a short description of the government of the United States. You will find that the Constitution is a written agreement under which the people of the states which joined to form the United States, many years ago, agreed to live. This Constitution divides the government into three parts, one of which makes the laws, another carries them out, and the third decides whether or not they have been broken. The powers and the duties of all are described, and you will see that the officers of none of these parts can do as they please but must obey the rules laid down in the Constitution. We find that the President of the United States has greater power than many kings, and that no other court has such authority as the Supreme Court of the United States.

HOW THE UNITED STATES IS GOVERNED



WE are giving you in this section a little account of the government of the United States which will help you to understand many things. As you read United States history, or even the newspapers, you will find many references to the Constitution, and will find that there have been many disputes about its exact meaning. You cannot understand much about the history of the nation unless you understand about the government of the United States.

But why should you trouble your head about these matters of which the grown-ups talk? Surely children have nothing to do with them. Here is where you are wrong. The boys and girls of to-day are the men and women of to-morrow. One of these days you will be expected to have a share in the government. All boys born in this country, and many who were not, will have to do their share in governing the country after they become twenty-one years of age.

A few years ago girls sometimes said that they had nothing to do with government. Even then, in several states women had exactly the same rights of voting and holding office as men. In 1920 an amendment to the Constitution gave every woman in the United States exactly the same rights of voting as men, and since that time many more women have been elected to important offices than before.

More than this, however, is the fact that boys and girls cannot be intelligent men and women or good citizens unless they know something about the laws of the land in which they live and can understand why such laws are necessary. Everyone wishes to be a good citizen.

WHY DO WE HAVE A GOVERNMENT AT ALL?

The word government means, first of all, guiding or steering. Then the government of any country means the management of that country, and it is needed, just as a family or a factory needs management. In all countries there are, and always have been, bad people who would harm themselves and others unless prevented by something stronger than themselves. So one of the purposes of government is to prevent and to punish bad actions, to protect the people who behave themselves properly against those who wish to do wrong. Without a government of some sort the strongest could do as they pleased and the weak would have no rights at all. The strong man might rob the weak and the helpless.

Then, too, the citizens of one nation must be protected from the armies of other states. You will find when you read the history of the world that people have very often not been satisfied to stay in the land in which they were born but have often tried to take other lands by force. There have been many wars for this reason, and a part of the duty of a government is to protect its citizens from attacks by governments outside. These two things, that is, to keep order in the land and to protect the land and its people from outsiders, are the first and most important things a government has to do.

OTHER THINGS WHICH CIVILIZED GOVERNMENTS DO

There are many other things which the governments of civilized nations do which add to the health, the happiness, the wealth or the convenience of the people. For example, all civilized governments now provide schools for the children, care for the poor, the afflicted and the insane, make roads, pave streets, build bridges across streams, carry mails, build lighthouses, and do many other things that you can name if you think a moment.

Most countries are so large that they are divided into parts, and sometimes these parts are again divided. As I am writing this article, four different governments are over me. First is the United States, then the state of New York, next the county of New York and finally the city of New York. Some of these have one part of the work of government and some do another. But it is with the first, or government of the United States, that we shall say most. This does not mean that the state government is not important.

THE KINDS OF GOVERNMENT NOW FOUND IN THE WORLD

We find in the world to-day two kinds of governments, which are known as MONARCHIES and REPUBLICS. In times past there have been a few governments known as DEMOCRACIES. The word monarchy means the rule of one, while in a republic the people rule through men whom they choose for the purpose. In a democracy every man votes on every question. You can easily see that a democracy must be very small. In a large country it is impossible to have all the people meet to decide every question.

Monarchies are of two kinds, known as Absolute and Limited, and the ruler holds the power for his life and then it passes to his child or nearest relative. In an Absolute Monarchy, the ruler, called a king, emperor, or some such name, has the entire power. His word is law. Whatever he orders must be done, no matter how foolish or how cruel it is. There are few such governments now, though once there were many. Even in Turkey the people gained a share in the government, and in Russia they drove the czar from his throne. No important country is now an absolute monarchy.

In a Limited Monarchy, the power of the ruler is limited, or lessened, by a constitution which tells what the ruler may do and what he may not do. In some of these governments, especially in the Far East, the ruler still has great power. In others, such as England, he has very little, very much less than the President of the United States. The constitution tells what are the rights of the people. In all the limited monarchies the people have a share in the government.

In a Republic, the people have the power, which they give for a short time to officers elected by them, who carry out the laws. Other men chosen by the people make the laws. If the people think that an officer has not acted wisely or properly, they can turn him out at the next election or can bring him to trial before the end of his term.

THE GOVERNMENT OF THE UNITED STATES

The United States is a republic. The plan of government is set forth in the Constitution, of which we are about to tell you, and which is the "supreme law of the land." This means that no law can be made by nation, state or city which is in opposition to the Constitution in any way; that no officer or judge may do anything forbidden by the Constitution, and that he must do what is commanded by it.

The paper divides the government into three parts, the LEGISLATIVE, or law-making; the EXECUTIVE, which carries out the laws; and the JUDICIAL, which decides whether or not the laws have been broken. Each of these is independent, to some extent, of the others, and each of them helps to prevent the others from becoming too powerful.

THE LEGISLATIVE POWER

The Legislative power is in the hands of Congress, which is made up of two houses. In one, called the Senate, each state, large or small, has two members, who, until 1913, were elected by the legislatures. Now they are elected by the people. These Senators represent the people of the whole state and serve for six years. A Senator must live in the state he represents, must be at least thirty years old, and, if he was born outside of the United States, must have been a citizen nine years.

The House of Representatives is made up of members elected from states according to the population. Every ten years, after the people of the whole country have been counted, Congress decides how many Representatives there shall be in the House and then divides them among the states according to population. The legislature of the state usually divides the state into as many districts as it has members. Several states have only one Representative each, while New York has forty-three and Pennsylvania thirty-six. Members are elected by the people for a term of two years. A Representative must live in the state he represents and must be at least twenty-five years old. If he was not born in the United States, he must have been a citizen at least seven years.

THE POWERS OF THE SENATE AND OF THE HOUSE

The duties and powers of the houses are not quite the same. The House of Representatives chooses its president, who is called the Speaker, though he does almost no speaking; the Vice-President is the president of the Senate. No law can be made unless both houses approve, but every measure which has to do with taxation must be first passed by the House of Representatives, and then sent to the Senate. This is because the Representatives were supposed to be closer to the people, who dreaded giving the power to tax to anybody because of their experience before the Revolution.

The Senate has some powers which the House has not. It shares with the President the power to make treaties or other agreements with foreign nations; it must approve of the men the President selects for high offices; and if the President or other high officers of the government are charged with crimes, the Senate sits as a court to try them.

THINGS CONGRESS IS ALLOWED TO DO

The Constitution tells what kinds of laws Congress may make and what kinds are forbidden. For example, Congress may borrow money. This it does by issuing bonds, which are promises to pay a sum of money at some future time. Congress may make laws about trade, may coin money, make laws to punish imitators of this money, and may establish post offices and post roads.

Congress is also given power to make war, and to raise and support an army. Here the fear the people had of a standing army caused them to say that all money voted for an army must be for two years or less. At the end of that time the money must be voted again. Some other things Congress may do, are to build and keep a navy, make laws for the capital city, or for territories, erect forts and do all other things which are necessary to carry out the Constitution.

THINGS WHICH CONGRESS MAY NOT DO

On the other hand, Congress was forbidden to do several things. It could not forbid the slave trade for twenty years after the Constitution was made, nor can it lay any tax on goods sent out from any state. This last provision was put in because every state was jealous of the others and feared that Congress might tax the goods produced by that state. It was also forbidden, for the same reason, to give the seaports in any state any advantage over those of another.

The men who made the Constitution feared that some attempts to make one class of people higher in rank than another would be made, so they forbade Congress to give any title of nobility, and also forbade any officer of the United States to receive any present or title from any foreign government, for fear that he might be influenced by the honor. It was forbidden also to pass any act declaring a man guilty without a trial, or to pass a law to punish a deed after it had been committed.

THE EXECUTIVE POWER, AND THOSE WHO HOLD IT

The chief officer of this part of the government is the President, chosen for four years. There is nothing in the Constitution to prevent the election of any man for as many terms as the people desire, but since Washington and Jefferson each refused to serve more than eight years, it has been the custom to elect no man more than two terms, and many Presidents have not been elected more than once.

The President and the Vice-President are not voted for by the people. At the time of the adoption of the Constitution there were no quick ways of traveling or of spreading news. There were few newspapers, and the people of one state knew so little of those in other states that it was thought impossible for the people generally to know enough about the great men of the country to make a proper choice. So it was decided to have the people of a state select a number of prominent men equal to the number of their Senators and Representatives taken together. These men, called Electors, were then to meet and choose a President and a Vice-President. The same custom is kept up now, but it is known at the time the Electors are chosen exactly how they will vote. Therefore, though we do not vote directly for the President and Vice-President, it amounts in the end to the same thing.

WHO CAN BE PRESIDENT OF THE UNITED STATES

The President must be a "natural born citizen of the United States," and must be at least thirty-five years old. As it has turned out, nearly all of our Presidents have been over fifty years old when elected. If he should die or become unable to serve, the Vice-President takes his place, and so, of course, the same rules must apply to choosing a Vice-President. Congress was given power to decide who shall be President in case both President and Vice-President die, and has done so by making the members of the Cabinet the successors. So far in our history, both President and Vice-President have not died in the same term.

The President is commander-in-chief of the army and navy, though no President has ever taken the field in person. He appoints all the higher officers of the army, but the Senate must approve, and decides which one of the generals shall be in charge of the army or armies. Lincoln always took great interest in all the plans of the generals and often changed them. The President also has power to grant pardons except in cases of impeachment. This means that, even though a man has been convicted and sent to prison, the President can release him if he has broken a law of the United States. With the laws of a state the President has nothing to do.

The President has power to make treaties, that is, agreements with foreign nations, but two-thirds of the members of the Senate must approve before they become law. With the consent of the Senate he also appoints ambassadors, ministers and consuls to represent the nation in foreign countries. He also appoints United States judges and thousands of other officers not otherwise provided for, but the consent of the Senate is necessary before they can take up the duties of any of these offices.

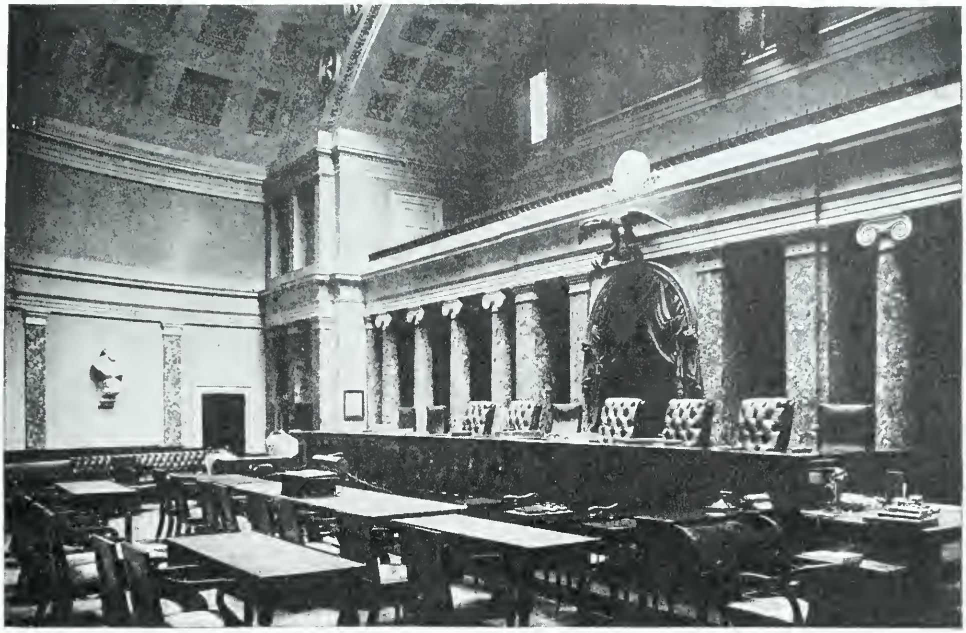
The President is instructed to give to Congress every year information on the state of the Union together with his recommendations. Both Washington and Adams visited Congress in person and spoke. Jefferson was a poor speaker and sent his recommendations in writing. Every President followed his example, until President Wilson, who went back to the old custom of speaking to both houses of Congress in person. The President and all other officers can be removed from office by impeachment. One President, Andrew Johnson, was impeached but was declared not guilty. Enough has been said to show that the President is a very powerful ruler—much more powerful than most of the kings in the world. Yet there is little danger of any President's becoming a dictator or a tyrant. He cannot control the other parts of the government, and the people can turn him out before he becomes too powerful, if he should attempt to misuse his great powers; or he can be impeached by the House of Representatives.

THE ADVISERS OF THE PRESIDENT

The Constitution does not say anything about the advisers of the President, now called his Cabinet, except to say that he may consult with the heads of the departments. At present there are ten of these Cabinet officers. Congress at first created only three heads of departments, called the Secretaries of State, of the Treasury and of War. The Secretary of State has charge of foreign affairs; the Secretary of the Treasury looks after the money, and the Secretary of War looks after the army. The Attorney General was not considered a head of a department in the beginning, but was to give legal advice when needed.

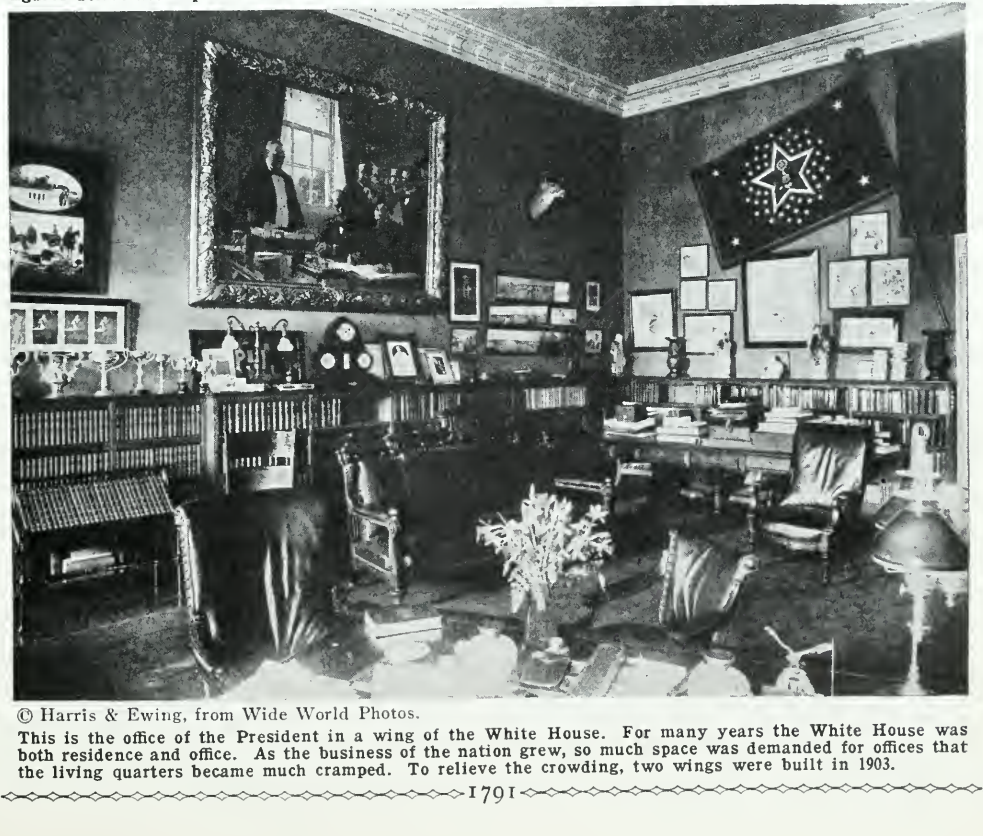
Since Washington's time the Navy Department, which controls the warships and all concerning them, has been created. The Post Office, which controls carrying and delivering the mails, existed from the

SUPREME COURT AND PRESIDENT



© Harris & Ewing.

Originally only the central part of the Capitol was built. This room, now occupied by the Supreme Court, was the Senate Chamber until the new wings were erected. Here Webster, Clay, Calhoun and other great figures deliberated upon the affairs of the nation in the days before the Civil War.



© Harris & Ewing, from Wide World Photos.

This is the office of the President in a wing of the White House. For many years the White House was both residence and office. As the business of the nation grew, so much space was demanded for offices that the living quarters became much cramped. To relieve the crowding, two wings were built in 1903.

beginning but was not considered a department until much later.

The Interior Department has to do with public lands, Indians, the Patent Office, and pensions, and other things which have to do with the welfare of the people. The Department of Agriculture collects and distributes information valuable to farmers, and has charge of the Weather Bureau. This Weather Bureau studies rainfall, winds and climate, and predicts the weather in advance.

The next department organized was that of Commerce and Labor, which had charge of all matters belonging to commerce, mining, manufacturing, the fisheries, the census, the lighthouses and many other things. In 1913 this department was divided and a separate Department of Labor was established.

THE JUDICIAL POWER OF THE UNITED STATES

The Supreme Court is the highest court of the land. It has nine judges appointed by the President for life or good behavior. Congress has also established circuit courts and district courts below the Supreme Court. They are entirely separate from the state courts, with which the United States has nothing to do unless the Constitution is violated. They try men who have broken the laws of the United States by such acts as robbing the mails, or using them to cheat; by making imitations, called counterfeits, of money; or by cheating the United States out of taxes. They have nothing to do with the laws of the states.

These courts also try cases between citizens of different states, cases having to do with sailors and ships, and the like. Where ambassadors are concerned, or where a state sues another state or the citizens of another state, only the Supreme Court can try the case. The Supreme Court can declare any act of Congress or of a state legislature to be "unconstitutional." If it does this, the act no longer has any authority, but is wiped out. This is a very great power which no other court in the world has. Both houses of Congress may pass an act, the President may sign it, and then it may be set aside by nine men or a majority of them.

Then the Constitution goes on to declare that all criminals shall be tried by a jury and that the trial shall be held in the state where the crime was committed. This provision was made because the people, while colonists, had seen their fellows tried by prejudiced judges and had known the hardships of being taken from home for trial.

OTHER PROVISIONS OF THE CONSTITUTION

No state can treat the citizens of another state differently from its own, and if a criminal flees from his own state into another, the officers of the second state must give him up. No state can tax goods coming from another state, keep an army or navy, coin money, grant a title of nobility, or enter into any treaty with another state or with a foreign power.

New states may be formed by Congress, but no state may be divided, nor may two states or parts of states be joined without the consent of the legislatures. The small states had this inserted, as in the beginning they feared that they would be joined to the larger states against their will.

The United States must see that each state has a republican form of government. This means that it is the duty of the United States to protect the rule of the people. Congress would prevent any man from making himself dictator of a state. The laws of Congress are above the laws of any state, and if they disagree, the state must give way.

AMENDMENTS TO THE CONSTITUTION

It is made very difficult to change the Constitution, and very few changes have been made. The first ten amendments were added in 1791, the eleventh in 1798, the twelfth in 1804, and the next three as a result of the Civil War. The others have been recently adopted. Only nineteen changes or additions have been made since the government began. The first ten are really a part of the Constitution itself, and most of them grew out of the experience of the states before the Revolution. Several of the states were unwilling to ratify the Constitution, because they thought that certain rights were not properly protected, and proposed amendments when they agreed to accept the document.

One of the amendments forbids Congress to make any law favoring or punishing any form of religion. Every man must have the right to worship as he pleases. A man cannot be punished for his speeches or his writings unless they are intended to slander. Our Constitution says the people have these rights, which cannot be taken away by any officers.

You remember the Writs of Assistance which caused so much trouble before the Revolution. Such things are not allowed in the United States; nor can any man be tried twice for the same offense; nor can he be compelled to testify against himself; nor can private property be taken unless it is paid for.

Every criminal is entitled to a trial by jury, and has the right to hear the witnesses against him. No man can be tried in secret, nor shall excessive fines be imposed nor cruel or unusual punishments be inflicted. The government, for example, would not allow any state to punish a crime by cutting off the ears or by branding with a hot iron, as once was done in several of them and in Europe also.

The eleventh amendment says that a state cannot be sued in court by a citizen of another state. The twelfth changed the method of voting for President and Vice-President. At first every Elector voted for two men. The one who received the greatest number of votes was President, and the next highest Vice-President. Since 1804 the Electors vote for the two officers separately.

THE CIVIL WAR AMENDMENTS WHICH ABOLISHED SLAVERY

The Civil War amendments began in 1865 with the thirteenth, which abolished slavery in the United States. This was followed by the fourteenth, in 1868, which declared the negroes to be citizens and forbade the payment of any of the Confederate debt, or any payment for the loss of any slaves.

The important fifteenth amendment, adopted in 1870, gave votes to the negroes by forbidding any state to deny any citizen the right to vote "on account of race, color, or previous condition of servitude." Since that time many amendments have been proposed, and four have been adopted. The sixteenth amendment, which was ratified by a sufficient number of states in 1912, allows Congress to levy a special tax on incomes. The seventeenth (1913) has taken the right to elect Senators from the legislatures and given it directly to the people. They became a part of the Constitution in 1913. The prohibition amendment was ratified in 1919, and that giving suffrage to women in 1920.

WHAT THE CONSTITUTION WAS INTENDED TO DO

While the Constitution was intended to give the people the right to govern themselves, it was not intended to give the party which happened to be in the majority in any year the right to do everything it wished. Sometimes men object because the Constitution does not allow some law to be made which they favor, but this is because the Constitution tries to protect all.

As you have seen, Congress is permitted to do many things, but at the same time it is forbidden to do many other things. It is what is called a government of limited powers. In some countries the legislature can pass any act it chooses.

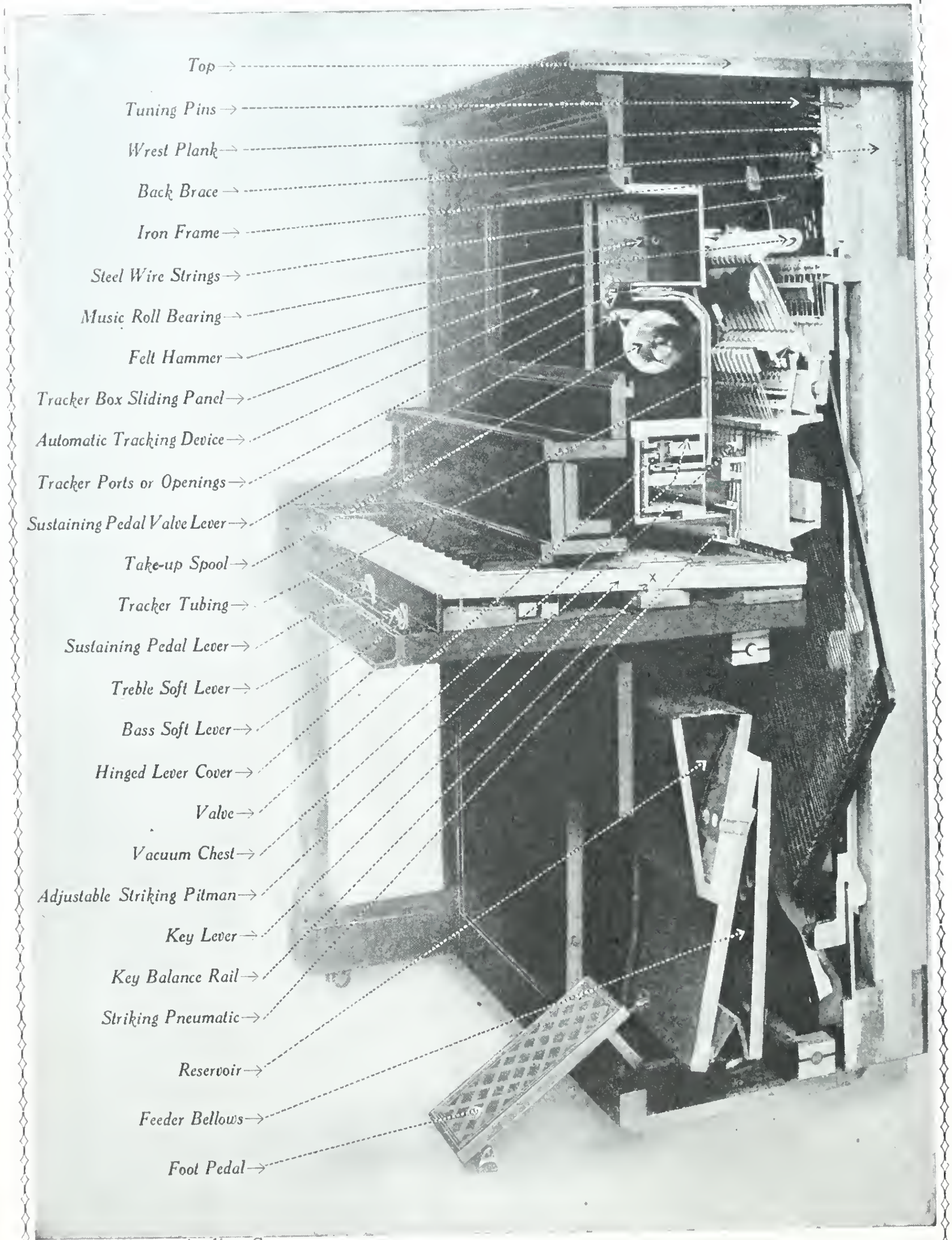
Many of the things Congress is forbidden to do are those under which the colonies had suffered during British rule. They are the things which a strong and powerful part of the people might do to a weaker part. For example, Congress may not declare any man guilty without a trial, though such a habit had been common in Europe; nor may it lay taxes on the goods produced in any state. These parts of the Constitution were intended to protect the rights of the weaker side.

THE CONSTITUTION TO-DAY

For more than a hundred and twenty-five years the Constitution has been in operation. During that time the nation has grown from four million people into one of more than a hundred million; from a union of thirteen feeble states into a great nation of forty-eight states with other territory in both the Old and the New Worlds. The plan of government has served well and seems to be still strong. Yet we must realize that the history of the United States is very short as the historian counts time. Other nations have existed for hundreds and even thousands of years and have then fallen. We must acknowledge that, as yet, the government is an experiment. Never before that time had the attempt to give the people authority to govern themselves been tried on so large a scale. Thus far the plan has succeeded wonderfully well, and for much of the success the Constitution is responsible. It prevents hasty changes, and at the same time allows the will of the people to express itself.

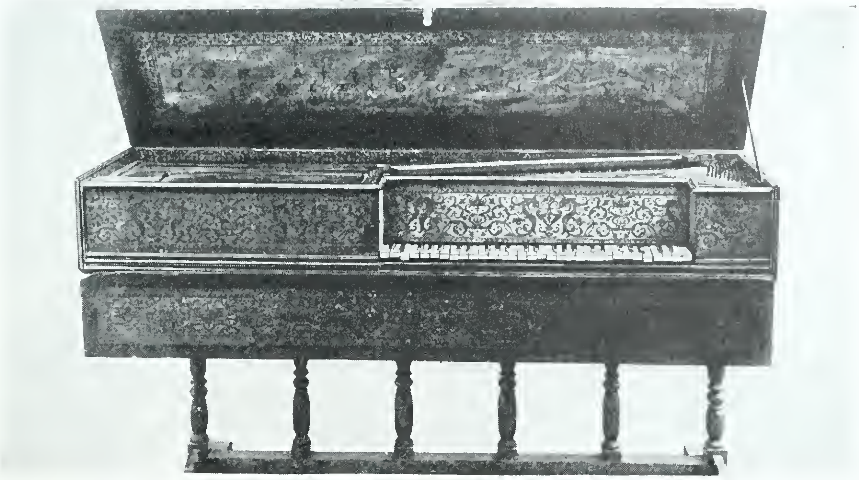
THE NEXT STORY OF THE UNITED STATES IS ON PAGE 1905.

WHAT MAKES THE PLAYER PIANO PLAY


Top
Tuning Pins
Wrest Plank
Back Brace
Iron Frame
Steel Wire Strings
Music Roll Bearing
Felt Hammer
Tracker Box Sliding Panel
Automatic Tracking Device
Tracker Ports or Openings
Sustaining Pedal Valve Lever
Take-up Spool
Tracker Tubing
Sustaining Pedal Lever
Treble Soft Lever
Bass Soft Lever
Hinged Lever Cover
Valve
Vacuum Chest
Adjustable Striking Pitman
Key Lever
Key Balance Rail
Striking Pneumatic
Reservoir
Feeder Bellows
Foot Pedal

Photo, courtesy Aeolian Company.

The power of the air is used to-day in a hundred ways, but there is no more ingenious application of it than that which enables a child to play the piano without knowing a note of music. From the simple process of admitting air through a small hole in the unwinding music roll, thence communicated to a suction bellows, lifting a lever and causing the hammer to strike the corresponding key, the player piano has been brought to a perfection of artistic performance that few professional pianists attain. The best interpretations of classical music or the rattle of the jazz are equally within its capacity and repertoire.



Photo, courtesy Metropolitan Museum of Art.

A clavichord, one of the instruments used before the invention of the piano.

HOW WE GOT THE PIANO

IN the early days of the world, ages and ages ago, a hunter shot at an animal that he wished to kill for food. His bow was tightly strung, and as he loosed his arrow the string sounded a high, clear, musical note. Full of curiosity, he twanged it with his fingers and found that he could get the sound again. Soon every man in the village was twanging his bow, and that is how the first beginning of all our beautiful harps and violins and pianos was made. Of course it took a long time for the piano to grow out of the bowstring, and the people of many ages and many countries helped its growth.

The harp was the first instrument with strings that began to take shape and grow. Some rude musician of those far-off days discovered that he could make a larger number of sounds with two strings than with one, and so another string was added, and then another and another. All this was done so long ago that we cannot even follow the steps that were taken.

But we know that the ancient Egyptians made harps, with many strings, of a beautiful shape; that they knew that sounding-boards increased the tone and made it richer; and that they had learned how to tighten their strings on pegs. Probably the Hebrews learned from the Egyptians how to make and use the harp, and we know that many of the psalms, or sacred songs, were written to be sung to its music. The Assyrians, too, made harps, and they also played on dulcimers, in which the strings were struck by hammers. This was the first instrument on which music was made by striking strings with a hammer, and that, you know, is how the piano is played.

The Greeks knew a good deal about music. Centuries before the coming of Christ they learned, perhaps from the Egyptians, how to measure the intervals of a scale on a little instrument called a monochord. This was only a string stretched tightly across bridges, but, as we shall see, it led to greater things.

Later on in history the Irish people made very fine harps, and at one time it seemed as if they would lead the world in music. It is believed that from them the Italians learned to make the harps for which they became famous.

THE CLAVICHORD, WHICH HAD KEYS

In the early centuries and in the Middle Ages, when no musical instruments were used in the churches, the monochord was used to give the pitch to the youths and young men who sang in the choirs of the cathedrals and monasteries. By and by its usefulness was increased by adding more strings, so that intervals of the chants could be taught also; and it is thought that the first idea for the clavichord was taken from a monochord to which more strings had been added, when, of course, it ceased to be a monochord, for that word means "one string."

Sometime, probably in the fourteenth century, someone invented the clavichord, and this was a big step toward making the piano, because the clavichord had keys. This instrument was made like a box inside of which there were a number of strings stretched across bridges. At the end of each key of the clavichord there was an upright piece of brass called a tangent. When the key was pressed, the tangent sprang up and by striking against one of the wires produced a note.

About a century after the invention of the clavichord the spinet, or virginal, came into fashion in England. This was the instrument on which Queen Elizabeth played, and was very much like the harpsichord, which came later. In both, a wooden arm set upright at the end of a key held a tiny quill which sprang up and plucked the string and then fell back again. The harpsichord was shaped very much like a grand piano. You see we are coming very near the piano, and also very near our own time. The great composers, down to Mozart and Beethoven, wrote for, and played on, the clavichord and harpsichord.

THE FIRST PIANO WAS MADE IN ITALY

The first real piano was made in Florence by an Italian named Christofori, about the year 1709, not much more than two hundred years ago. It was called a pianoforte because it could be made to give either soft tones or loud ones, and the name has been shortened to piano, which simply means "soft." Christofori made a number of pianos, but only two are known to be left in the world. The older of the two is in the Metropolitan Museum, and when you pay a visit to New York, you should be sure to see it. At first the new instrument was looked upon as a curiosity, but it was soon made in Germany, France and England. Many improvements were made in it in each country, and in a short time it came into general use.

THE FIRST PIANOS MADE IN AMERICA

The first pianos seen in America were made in England, but it was not long before they were made on this side of the Atlantic. In 1775 John Behrend, of Philadelphia, built the first piano ever made in America. Pianos have been built continuously since that time, and now there are many factories where excellent pianos are built, both in the United States and Canada.

At first the framework of a piano was of wood, but it was found that this was not strong enough. In 1800 an English engineer, John Isaac Hawkins, who lived in Philadelphia, built an upright piano in which he used an iron frame. In 1820 a Scotsman named Allen made a piano frame of iron tubes. This was improved on a few years later, in 1825, by Alpheus Babcock, of Boston, who made a cast-iron frame for a square piano. In 1843 Jonas Chickering, of the same city, made a full iron frame for a grand piano, thus completely solving the difficult problem of giving proper support for the great strain of the strings.

In 1855 Henry Steinway, a German who had come to live in New York, made a great improvement in the way of placing the strings in a piano. So you see that America has had a large share in producing the wonderful instrument that we know to-day. Many other inventions have been made in connection with the piano, but it is impossible to tell them all in a short space, and we have here the main outlines of this interesting story.

HOW THE SOUND IS MADE ON A PIANO

And now we want to know how it is that by simply striking the keys of a piano we can make music. Music, we know, is sound, and sound is caused by vibration. It is easy to understand the vibration caused by drawing a bow across the strings of a violin, but the strings of the piano seem a long way off from the keys.

The answer is very interesting. Every key in the piano is a lever attached inside the case to a balanced piece of mechanism which ends in a hammer made of thick felt. This mechanism is called the action. But though this is an important part of the piano, it is only part. If we raise the cover of the piano we shall see that there is a strong iron frame shaped something like a harp. Across this steel wires are strung, stretched so tightly that if they were not immensely strong they would break; and if the frame were not immensely strong it would bend, or the pegs around which the strings are drawn would pull out.

THE DIFFERENT SIZES OF THE STRINGS

Down below the wires, or behind them in an upright piano, there is a sounding-board, and glued to the sounding-board are the bridges on which the strings rest. Some of the strings are longer than others, some of them are thicker and heavier than others. Those on the right hand—the treble side—are quite short, but they keep growing longer and longer, until the strings at the left-hand side, for the deep, low tones of the bass, seem to be too long for the case, and to find room they are stretched at another angle *across* some of the shorter strings. This is called "overstringing."

The strings are of very strong steel wire, which must be made in a particular way so that it will give a full, round tone. The strings of the very low bass are covered, or "overspun," with fine copper wire to make them vibrate more slowly. Every string belongs to a particular key, and most of the keys have three strings belonging to each of them. The low notes have only two, because they are thicker and overspun, and so can make a heavier sound.

Now let us go back to the keyboard, and strike a note, let us say middle C. Immediately its hammer springs up and strikes the three strings that have been tuned to sound this note in unison. The strings begin to vibrate. The bridge vibrates in unison with them. The sound is carried by the bridge down to the sounding-board, and the air all around is filled with waves of sound. That is how music is made on the piano. The beautiful story of waves of sound—how they are started and how they are carried to the ear—is told in the part of the Book of Our Own Life beginning on page 3305.

Many of the boys and girls who are learning to play the piano often ask how the instrument is made. This is a natural question, and to answer it for the readers of The Book of Knowledge pictures have been specially made which take us through one of the great factories which have made American pianos famous. These pictures are on the following pages. They commence where men who are skilled in a knowledge of wood pick out the pieces to be used in particular parts of the piano, and bring us straight through the factory, explaining the process of making as we go, until we find a finished instrument.

Photo, courtesy Metropolitan Museum of Art.

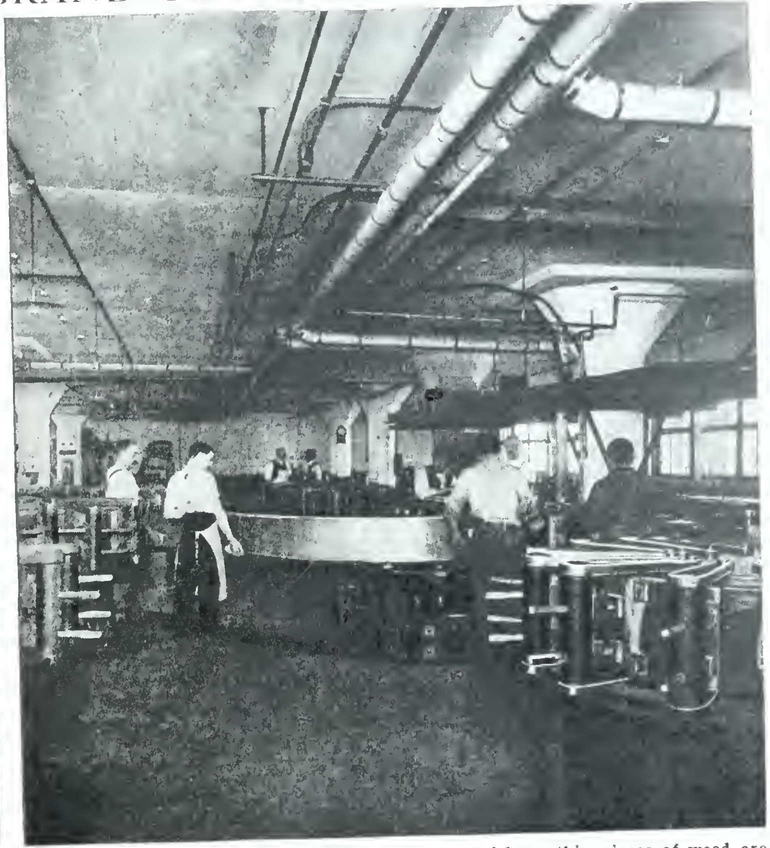
Two keyboards, for soft and loud music, were not unusual in a harpsichord, the instrument we see here. The harpsichord was a forerunner of the piano.

Recently many "player pianos" have been made under special names, but the general principle is the same. Holes corresponding to the notes in musical selections are cut in rolls of tough paper which are then inserted in the instrument. Air pouring through the holes lifts the hammers as the roll turns.

THE NEXT STORY OF FAMILIAR THINGS IS ON PAGE 1935.

HOW THE CASE OF A GRAND PIANO IS MADE

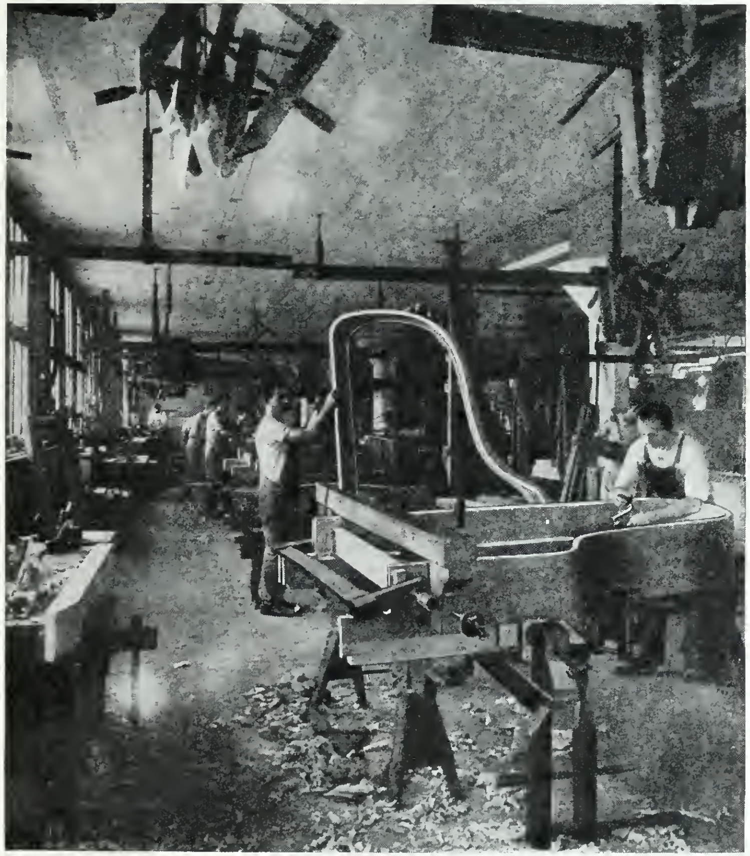
The first step in the making of a piano is careful choice of wood. The planks chosen must be well seasoned so that they will not crack or warp. After this is done they are cut into proper shapes and sizes, and are trimmed and planed to a satin-like smoothness.



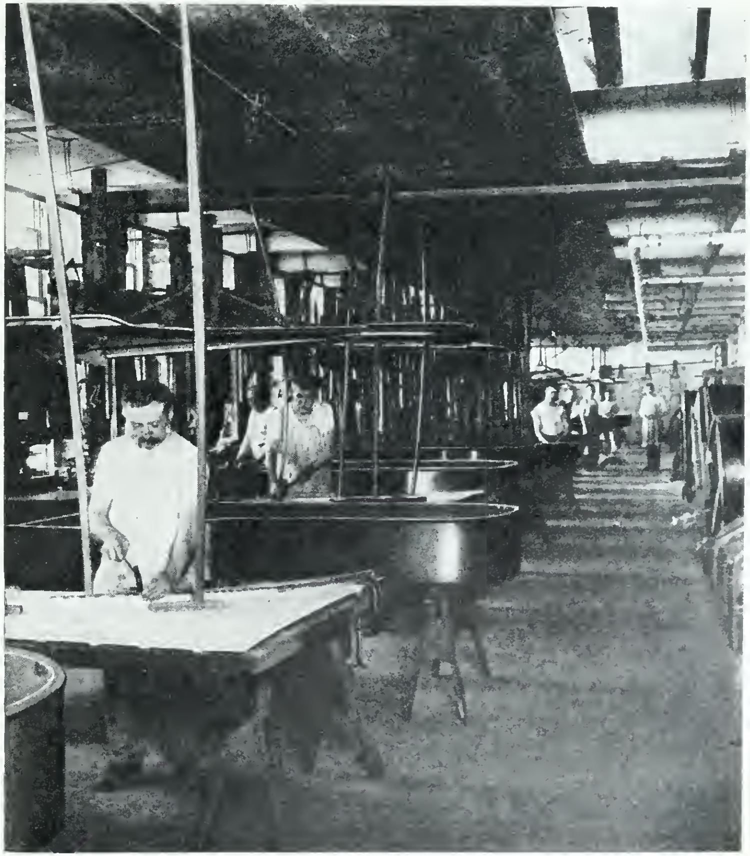
The next step is the making of the case. Layers of long, thin pieces of wood are put together with thin glue between them. The wood is then bent in large presses into the shape of a grand piano, and, as the glue sets, the wood becomes a solid piece of the proper shape and thickness, and of great strength.

Photos, pages 1798–1802, courtesy Steinway & Sons

FINISHING THE CASE AND MAKING THE SOUNDING-BOARD

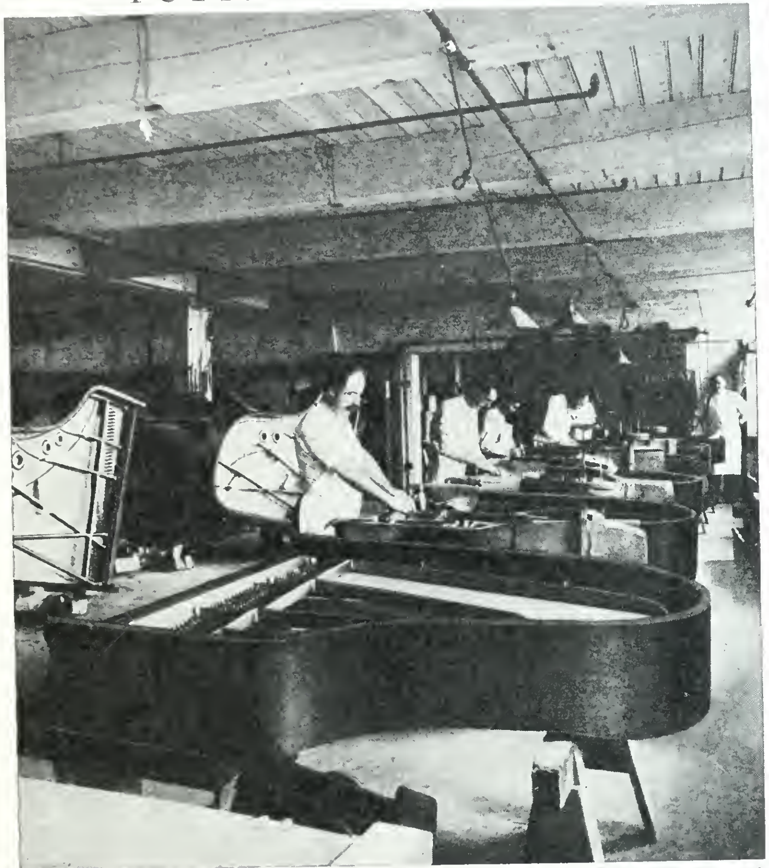


When the wood leaves the press it is called a "rim" and is turned over to the case-maker, who fits and glues into it crosspieces and braces to hold the case in shape. This picture shows one man preparing to fix a rim to his table and another making a rim into a "case." It is then sent to be varnished.

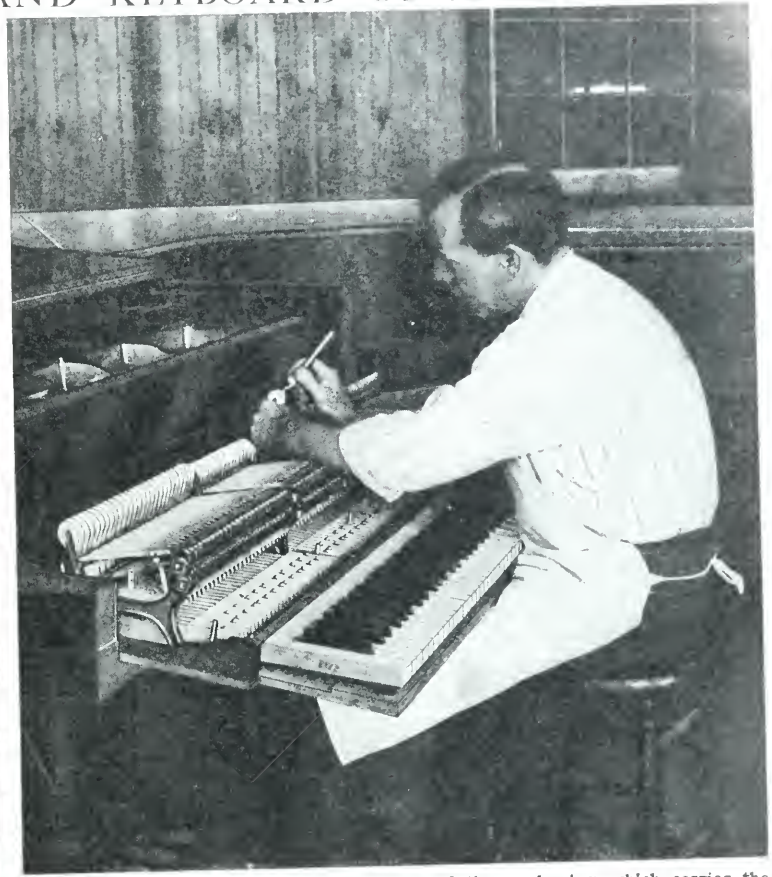


The case is varnished, and is then ready for the sounding-board, which the man in this picture is making. The sounding-board, which is a thin sheet of very light wood, is slightly arched, to resist the tension and weight of the strings that are afterward stretched across it. The bridge is put in above this board.

PUTTING IN THE STRINGS AND KEYBOARD OF A PIANO



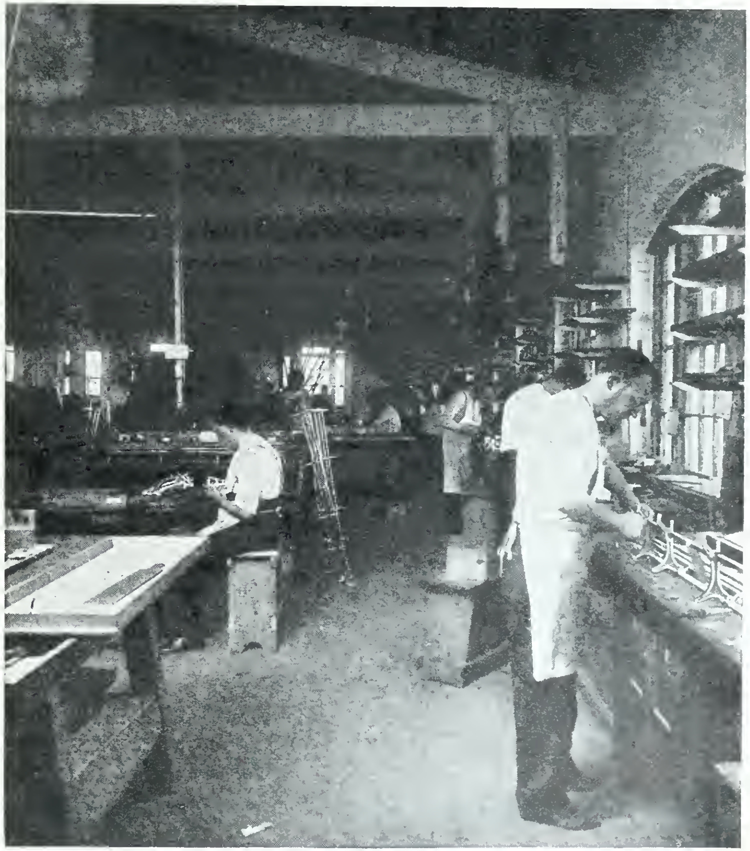
A strong iron frame, to hold the strings, has come from the foundry. When sounding-board and bridge have been glued in, the frame is bolted above them. The strings are then put in, so that each will touch the bridge, and are drawn tight around the strong pegs, which are set in the frame to keep them in place.



After the piano has been strung, the keys and the mechanism which carries the energy from fingers to strings are put in the case. The felt hammers which strike the wires are made in a press. They are hard at first and are pricked with a steel point to make them rough and soft enough to produce a mellow tone.

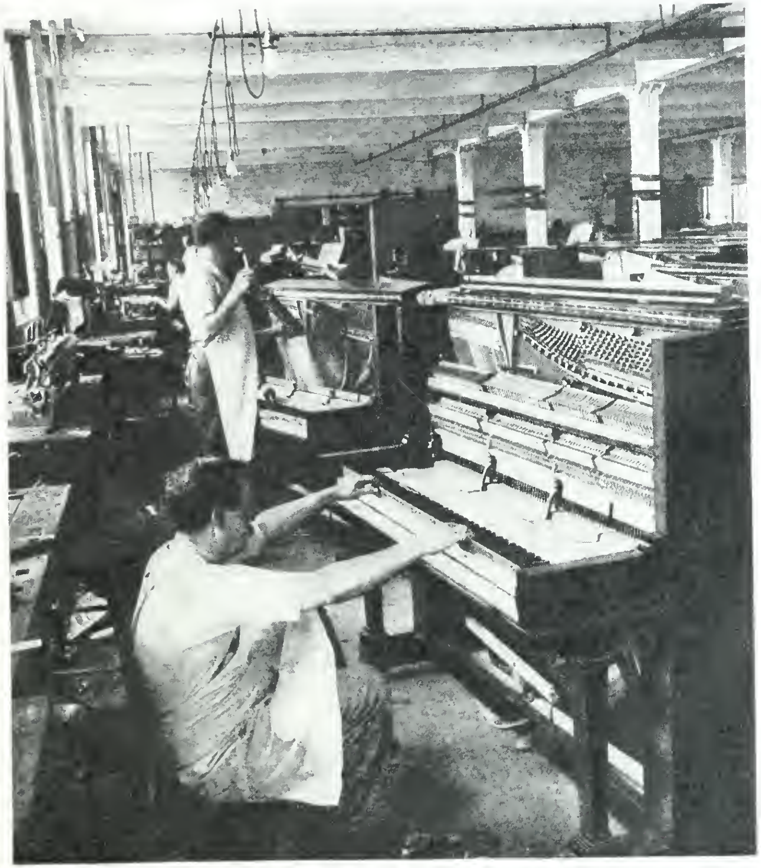
HOW THE KEYBOARD OF A PIANO IS MADE

The keys are made from one board, which is not sawn apart until the ivories have been glued on and polished. The keys, which are longer than the ivory-covered ends, are put in a frame in which each key is mounted on a pin which acts as a pivot. The key is really a lever which moves the hammer.



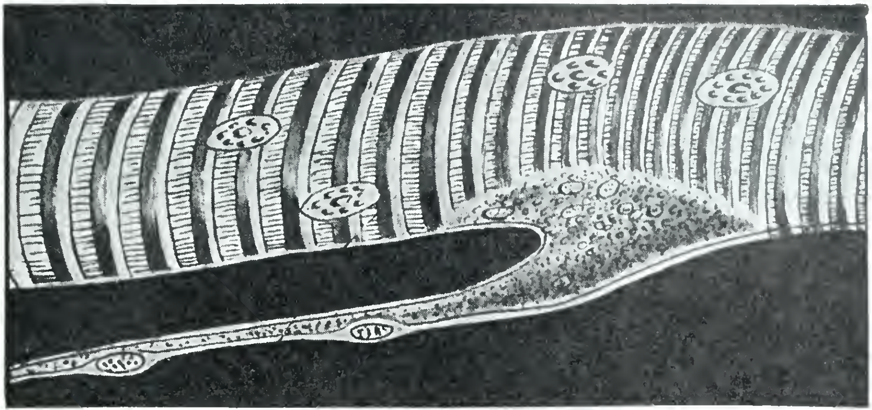
The mechanism by which the keys of a piano work is called its "action." There are many parts in each action, and its operation is performed by a complicated system of levers. The separate parts of the action are screwed on a frame that is mounted on the key frame. These men are screwing the action to the frame.

THE END OF THE STORY OF HOW A PIANO IS MADE



In this picture a workman is testing the level of the keyboard, and we can see a good deal of the action. If the keys are too low, or if they are uneven in height, the man will have to level them by putting paper punches under them. Here you can see the frame and strings at the back of an upright piano.

We have followed the making of a piano from the selection of the rough wood to the finished instrument such as many of us have in our homes. Most children can learn to play the piano well enough to give pleasure, if they work as carefully as the men who make these beautiful instruments for them.



A piece of striped muscle fibre, much magnified, showing a nerve attached to it.

THE MUSCLES AND THEIR MASTERS

THE muscles make up a very great part of the whole bulk of the body. As the body includes a bony system, so it includes a muscular system. The whole body would be useless without the muscles, for they carry out its orders. Without our muscles we could not move our bodies. Even the life of the body depends upon some of the muscles; for instance, those which you and I and every other human being on the earth are using for breathing at this moment.

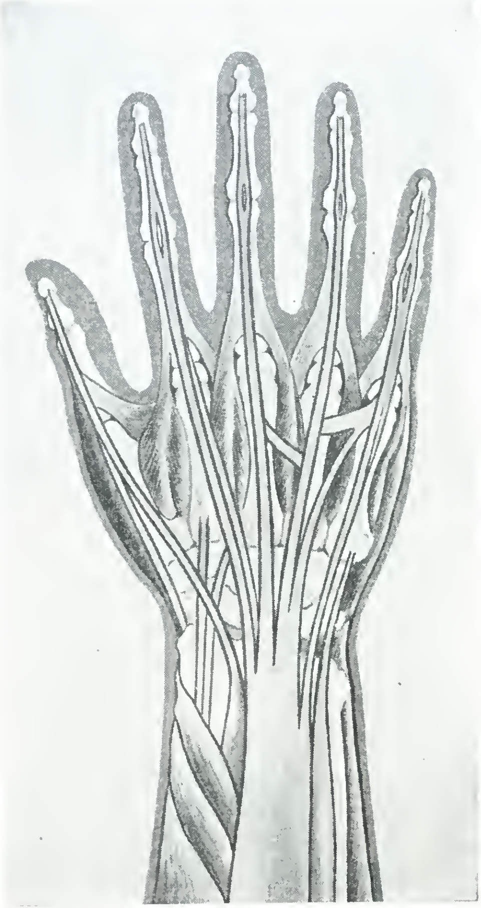
We must get right ideas of what a muscle is like. Muscles vary in shape according to the work they have to do. Some are thin and flat sheets; others are long and narrow, and so on. They cover almost the entire body. Our knuckles and our shinbones seem to have little or no muscle on them, but these are exceptions. The most usual kind of muscle ends in a sort of rope that runs to the bone which the particular muscle controls. If you look at the front of your wrist, or if you feel at the back of your knee, you will find some of these strong ropes. The proper name for them is *tendons;* sometimes they are called *sinews.* A tendon, or sinew, is part of a muscle, and is quite different from the things which bind the joints together and are called *ligaments*, a word which really means "binding things."

In the picture on page 1805 we see that a muscle has a body, which is the red flesh, the really living part of the muscle; and a whitish rope, the tendon, by which the muscle pulls on the bone. The picture shows us the biceps muscle of the arm. It is so called because it has two heads, or starting-places; these join and form the body of the biceps; then comes the great tendon, which ends in one of the bones of the forearm.

When the biceps or any other muscle contracts, or acts, its fleshy part shortens and swells, and so the two ends of the muscle approach each other. Every boy knows how the body of his biceps muscle swells when he bends his elbow, for this is the great lifting muscle of the arm. When a muscle contracts and moves things, it does work and spends power. We must find where the power comes from.

All muscles are richly supplied with blood. This helps to give them their red color, though most muscles also have in them a red coloring matter which is peculiar to muscles and not found in blood. It is the blood that supplies muscles with the power which they show when they act. It carries to them the food they must have.

Every machine—and a muscle is a living machine—turns some of the energy supplied to it into heat, not all into work. The more work it gives and the less heat, the better is the machine, for we want work and not heat. Any muscle is better in this respect than any machine ever made by man; and, further, the heat it *does* make *is* wanted, and properly fed muscles never wear out.



THE MUSCLES THAT MOVE THE FINGERS

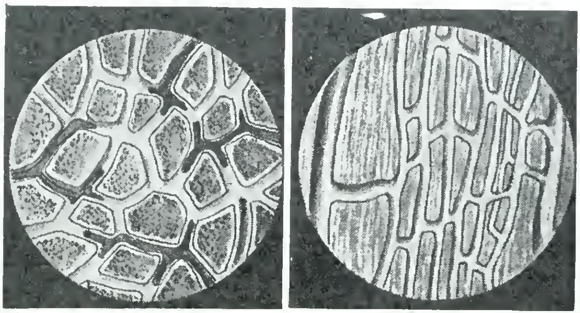
In this picture are shown the long slender tendons that run across the wrist and move the wrist and fingers. It is the arrangement of these tendons and their muscles that makes the wrist such a useful and precise instrument.

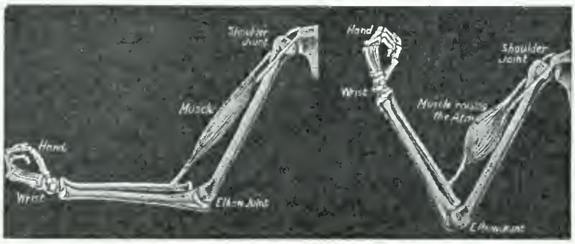
When we examine the red fleshy part of a muscle we find that this consists of millions of living cells that have grown into the form of narrow fibres, or threads, and are beautifully bound in bundles. The mystery of the contraction of a living muscle lies inside the protoplasm of the muscle-cells. The muscles of the skeleton, such as the biceps, differ from those which cover, let us say, the stomach. The first kind, which are under the influence of the will, show tiny cross striping when seen under the microscope; the other kind, which act apart from the will, show no such striping. So the two kinds of muscles are called *voluntary* or *striped,* and *involuntary* or *unstriped.* *Voluntas* is Latin for "will" and *in,* or *un,* means "not."

We can watch the development of a muscle from muscle-cells, which at first are round and small. When a muscle grows by exercise, certain muscle-cells which have never developed into active muscle-fibres are made to develop. When they are all used up, the muscle will grow no bigger, however long or well it is exercised. Different people differ widely in the number of cells out of which they can make muscle-fibres by exercise. A man who has never given a thought to the subject may be naturally two or three times as strong as many who spend much time in doing gymnastics.

The size of the muscular system is important in a few cases, as where a man is doing hard physical labor like shoveling coal; but it is of much less importance in any other way. It has nothing at all to do with strength of life. People often confuse strength of muscles with strength of life, or vitality. Women are, in general, much less muscular than men, but they have more vitality. They live longer, on the average, and can endure greater loss of blood, greater exposure, longer starvation or a greater quantity of poison than men. On every possible ground, strength of life is worth having; strength of muscle, which has no more to do with strength of life than a man's height has to do with his Christian name, is not of so much importance for human beings, who have conquered the world, and live in it, not by strength, but by skill. We should take care of our muscles, of course, but bigness does not always mean health.

But if we are to learn to take proper care of our muscles, we must find out what happens when our muscles carry out our orders. Running into every muscle of the body we find at least one round whitish cord which is called a nerve. One of these, called the ulnar nerve, runs down to give itself to several of the muscles of the forearm, and passes behind the elbow for a short distance practically between the skin outside it and the hard bone underneath it. If hit, it makes us uncomfortable and we call it the "funny-bone," though it is no more a bone than it is a comet. This nerve is what is called a *mixed* nerve. It has in it nerve-fibres running to muscles and making them move, and others running from the skin up to the brain for purposes of feeling. These two sorts of nerve-fibres are called *motor* and *sensory*. Everyone knows which fingers have their skin supplied from the "funny-bone" nerve, for when it is hit we feel tingling in the little finger and on the side of the finger next to the little one.


On the left is a section across a muscle; on the right a section along a muscle. Both show the network of tiny blood-vessels through which the blood flows from the arteries to the veins.



We see here how one of our muscles, called the biceps, lifts the arm by swelling up and drawing the bones together. The muscles are something like elastic, expanding and contracting.

Now we must consider these motor fibres. Especially we must see what we mean when we say that every muscle has motor nerve-fibres running into it. Suppose that by an accident the motor nerve of a muscle is cut; or suppose that by taking too much alcohol, lead or arsenic the nerve-fibres have been poisoned and killed, so that they might just as well have been cut across, so far as the muscle is concerned. Two things always result. The first is that the muscle cannot be used: it is paralyzed and lies still, however eagerly we try to use it; for it is motor nerves that are the motors and the masters of muscles. The second result is that the muscle always begins to waste and grow soft, flabby and small. And we know that the motor nerve is not merely the master of muscle, but a master that takes good care of his servant. Some kind of influence runs down all motor nerves to the muscles which they supply, and keeps those muscles in health.

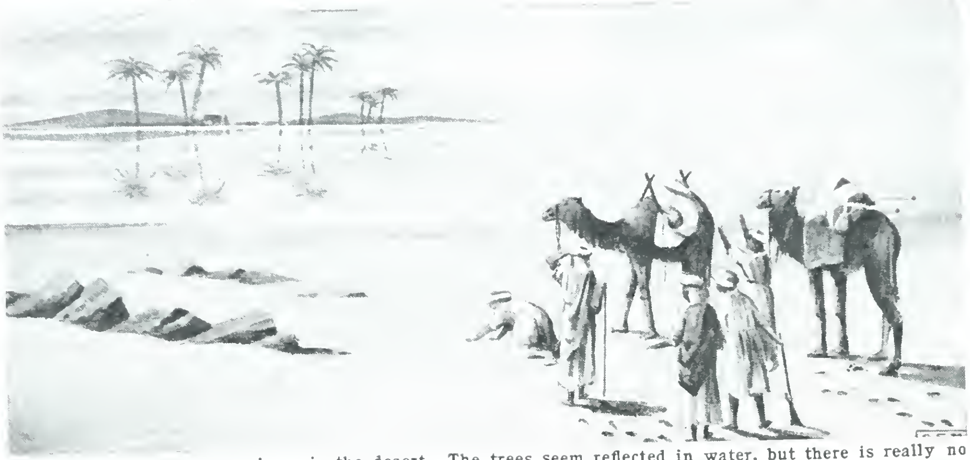
Muscles, then, are the servants of nerves; and there is a special way of putting this which is so good that we ought to learn it. The word "organ" means "instrument." We say that the eye or ear is the *end organ*—the instrument at the end—of the eye-nerve or the ear-nerve, just as the telephone on the desk might be called the end organ of the telephone wire. And now students of this subject have taught us that we ought to look upon muscles as the end organs of motor nerves—just the instruments which carry out their orders. If men and women—those who look after schools, look after soldiers, or are in any way responsible for the life and guidance of others—knew this truth, that muscles are just the servants of nerves and are to be treated as such, we should soon learn how to make almost all people become the healthiest and most happily useful kind of human beings.

If a frog is killed, it is quite easy to separate from its leg the muscle of its calf and the nerve that is the muscle's master. If this muscle is kept warm and moistened with water containing a little salt, it will live for quite a long time. If we pinch the muscle, or put chemicals on it, or if we even apply certain kinds of electricity to it, nothing happens; but if we do these things to the nerve, the muscle contracts so long as nerve and muscle are alive.

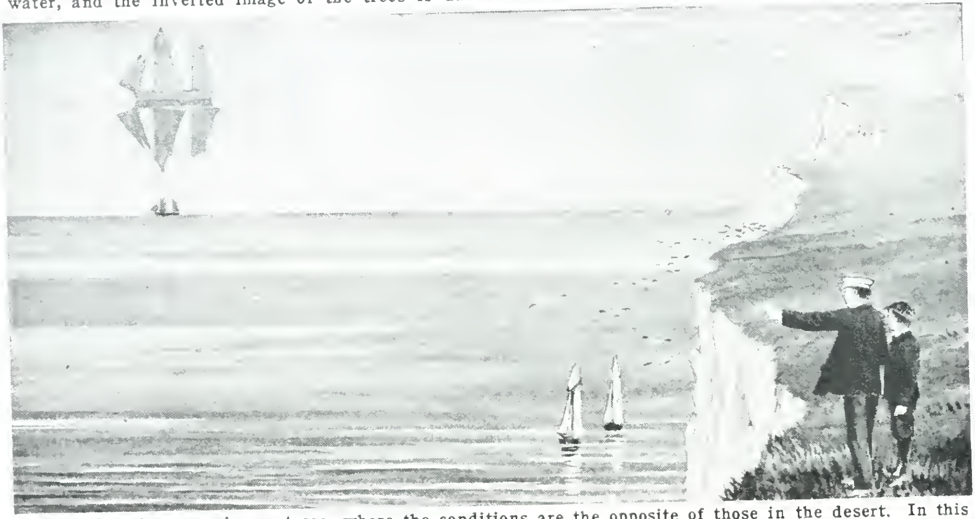
The nerve is a fibre or a group of fibres running from a nerve-cell or from nerve-cells. The master is the nerve-cell in the brain or the spinal cord. For every muscle in the body we know the exact group of nerve-cells in the brain or the spinal cord. If anything destroys them, the muscle is paralyzed and withers.

THE NEXT STORY OF OUR OWN LIFE IS ON PAGE 1929.

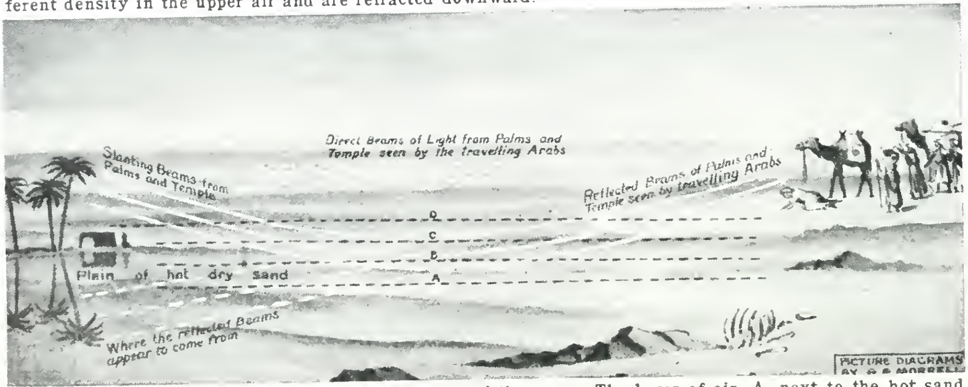
SEEING WHAT IS NOT THERE



In this picture we see a mirage in the desert. The trees seem reflected in water, but there is really no water, and the inverted image of the trees is due to the refraction, or bending, of the rays of light.

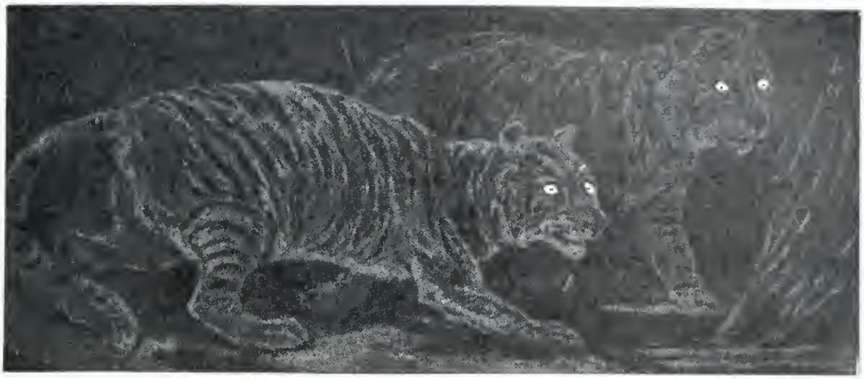


This picture shows a mirage at sea, where the conditions are the opposite of those in the desert. In this case the colder and denser air is the lowest layer. The light-rays from the ship strike upon layers of different density in the upper air and are refracted downward.



Slanting Beams from Palms and Temple
Direct Beams of Light from Palms and Temple seen by the travelling Arabs
Reflected Beams of Palms and Temple seen by travelling Arabs
D
C
B
A
Plain of hot dry sand
Where the reflected Beams appear to come from
PICTURE DIAGRAMS

This diagram explains the mirage shown at the top of the page. The layer of air, A, next to the hot sand is very warm, and different layers of air above, B, C and D, have different temperatures, and therefore different densities. Now, beams of light passing through gases of different densities are refracted, or bent, and the trees, as well as being seen by direct beams, are seen also by the reflected beams.



WHY CAN'T I SEE IN THE DARK?

"THE dark" is the absence of light. Now, what is the name for the absence of sound? What do we call the state of things when we hear no sound? The answer is silence. Let us remember after this always to think of darkness and silence as if they were a pair of things. By darkness we mean the absence of light, just as silence is the absence of sound.

But there is more to say. There may be a wave motion in the ether, but it is hardly proper to call that light until someone sees it. Similarly, there may be a wave movement in the air, but it is hardly proper to call that sound unless someone actually hears it.

Seeing and hearing, then, depend, first of all, on there being something outside of us—a particular kind of wave; and, secondly, on our being able to feel that something. In order to see, it must be there.

That is why we cannot see in the dark, because there is no light, and it is only light that we see. But, also, the seeing eye is necessary. A table in a dark room is there, though we cannot see it. There is no light, and so we see nothing. When we do see the table, as we say, we really see the light coming from it, and the form of the light tells us that the table is there. A blind man cannot see, even in the light. Our great poet Milton, in his poem on Samson, makes Samson say, when he had lost his sight:

> "Oh, dark, dark, dark amid the
> blaze of noon!"

That famous line will help us to understand what darkness may depend on—either the absence of light or the absence of the power to see light.

It is often supposed that cats and tigers can "see in the dark," but we must know that nobody at all can see if it is perfectly dark—that is to say, if there is no light at all coming from anywhere. When we speak of being in the dark we usually mean that there is so little light that we see hardly anything.

That is because our eyes are so made that they cannot alter themselves to suit the conditions of very dim light; but some animals can make the pupil of the eye so wide as to get the benefit of whatever rays of light are about. This is the case with cats, and if we watch the cat's eye when it is in the dark, we see that the pupil appears much enlarged. This allows all the light possible to enter the eye, and the cat, and other night-prowling animals that have eyes like the cat, are able to see very much better in dim light than we can. But even among human beings some people, especially seamen, can see farther in the dark than others.

WHAT SPECIAL VALVE HELPS LIFEBOATS TO KEEP AFLOAT

A lifeboat has many contrivances to give buoyancy to it by making it lighter than the water on which it floats: but the contrivance which keeps it from sinking when the rushing waves lessen this buoyancy is the one-way valve. Valves of this kind resemble doors or flaps in a pipe so hinged that they will open downward when a weight of water rests on them, but will not open upward. Thus the valve opens to let wave-water back to the sea, but the pressure of sea-water from below closes it more tightly.

WHAT IS BEAUTY?

We call anything beautiful which gives us pleasure, and that depends as much upon ourselves as upon what is outside us. Perhaps the majority of people find the sea, for instance, most beautiful when it is blue, and praise the blue Mediterranean, where the skies are clear and intensely blue, and so the sea is blue, too. If someone has lived in Italy as a child, and has to live beside a gray sea when he is grown up, he will think that the gray sea is ugly, and that nothing can be so beautiful as the blue sea. But suppose a Scotsman who loves Scotland had to go and live in Italy. He might find the blue sea after a little while very uninteresting and with too much of a glare in it. Only when he went home and saw the gray sea again would he find the sea beautiful.

We are made in different ways, and gray may be just as beautiful as blue if you find the right persons to look at it, just as the cry of a baby may be found more sweet in someone's ears than the finest note of the finest singer that ever lived.

WHAT IS GREENWICH TIME?

It is plain that as the earth spins round, the sun must appear to rise in the east sooner the farther east we are, and later the farther west we are. So the apparent time, judged by the sun's rising and setting, is different in different places, according as they are east or west of each other; indeed, midday on one side of the earth is midnight on the other side. It is not a question of north or south, because the earth does not spin in the north-south line, but in the east-west line.

So it is necessary to have some agreed place from which to take our time, and the place on which many nations have agreed is Greenwich, near London. They have their own time for their own purposes; but for general purposes, as, for instance, events occurring in the sky, they refer to Greenwich time—that is to say, the time reckoned by what the sun seems to do at Greenwich. The lines on maps up and down the earth's surface from north to south are called lines of longitude. They are narrower north and south of the Equator than at the Equator, of course, and meet at the Poles—like the lines usually made by the knife when we cut a melon in the most usual way. Places on the same line of longitude as Greenwich have Greenwich time exactly, and no other place can have it.

WHY DO WE SWING OUR ARMS WHEN WE WALK?

It is rather difficult to say exactly why we swing our arms when walking, but there is no doubt that it is much easier to walk in comfort if the arms are allowed to swing naturally than if they are held stiffly by the sides of the body. Probably, therefore, the swing of the arms assists us in unconsciously keeping accurate balance as we move along, first on one foot and then on the other. Walking is really falling forward and then recovering our balance by putting the other foot in advance.

In any case, the fact that it is so much more comfortable to walk swinging the arms seems to suggest that nature may have intended the swinging to help us in accurate movement.

WHAT MAKES US SAY WE ARE HUNGRY?

We have had many questions about animals which we have answered by saying that animals know things by *instinct,* and now we come to one or two questions about human beings which *we* know very much in the same way. No one needs to tell us when we are hungry. We know quite well without being told. Even a baby knows.

It is a fortunate thing that the cells of which our bodies are made have this power of making their wants known to us. As soon as there is too little food in the body, it means that the blood has not enough nourishment in it. There is a sinking feeling in the pit of the stomach, and it is this feeling which we call hunger. This is one of the few things that a human being knows without having to learn it.

WHAT IS A WATER-SPOUT?

Just as the waves of the sea are due to movements of the air, so the very astonishing disturbance of the sea called a water-spout is also due to an unusual disturbance of the air. Sometimes parts of the air get started in a twisting motion, rushing through the air and at the same time turning round and round very quickly, somewhat as the earth rushes through space and turns round all the time.

When this happens, the sea may be very violently disturbed; and sometimes in the middle of this twisting portion of air there is very little air indeed—it is almost like a hollow twisting column of air. Then the water just beneath may be suddenly sucked up so as to fill the almost empty space inside this twisting column of air, and that makes a water-spout.

WHERE DOES ALL THE DUST GO TO?

Dust is made of very different things, and its fate varies accordingly. Some dust is mainly made of particles of carbon, and these are gradually washed into the soil by the rain. We do not know whether they are useful there. Some of them get into our lungs and stay there. Then much dust is made of organic matter—substances coming from living creatures, such as horses, for example.

These street deposits of animals are a very important part of town dust. They find their way into the sewers, and so to the seas; or often to the soil, where, like all organic matter, they are extremely useful for the growth of vegetable life. This dust often gets into our eyes and throats, and probably helps to cause the colds that are so common in towns. Town dust will be less harmful when horses, dogs and cats are kept under better control—if, indeed, they are allowed in towns at all. A considerable part of the organic matter in dust is consumed and oxidized by the oxygen of the air, partly under the influence of the sun and partly by the action of microbes.

HOW DOES RUBBER RUB OUT INK?

When a rubber rubs out ink or pencil, or pumice-stone rubs out inkstains on our skin, what happens is really the same in every case. It is the rubbing, or the friction, that actually rubs away the outer layers of the paper or the skin, and so removes anything that they may contain. A soft rubber rubs away only the surface-layer of paper, but that is enough for pencil-marks, which only deposit a thin layer of carbon on the surface of the paper. A harder rubber—or a knife-edge, which acts in exactly the same way—will rub off a thicker layer of paper, and so will remove ink-marks, which penetrate much more deeply into paper. Pumice-stone is hardest of all, and when we rub our fingers with it, it removes inkstains, which are absorbed by our outer skin, as rubber could never do.

WHY DOES MOTHER PUT A MARBLE IN THE KETTLE?

The water we boil in a kettle is never pure water, but contains many things. It contains salts, which are apt to be deposited in the kettle as the water boils away. It also contains acids, which are able to act on the iron of the kettle, and turn it into salts of iron, which also fall to the bottom. We suppose, then, that people have noticed that if they put a marble in the kettle, it collects these salts and prevents these things from settling inside it, and keeps the inside of it smooth.

WHY DO WE LOSE THE SENSE OF SMELL WHEN WE HAVE A COLD?

The sense of smell depends upon tiny particles of things coming in the air to the lining of our noses, especially certain parts of the lining of the nose. When we have a cold, this lining, or mucous membrane, of the nose gets swollen, and produces a much greater amount of mucus than usual, as we all can tell by the number of handkerchiefs we have to use in a day.

The chief reason why we cannot smell so well when we have a cold is probably that this mucus, constantly pouring out of the lining of the nose and running over it, prevents the scent of things from getting to the sensitive part of the nose, and washes away any solid scented particles. Also, it may be that the poisons produced by the microbes that cause a cold, poison the living cells of the mucous membrane and also poison the tiny ends of the nerves of smell that run to it, so that, even if scented things do reach the sensitive part of the mucous membrane, they cannot be felt.

This applies alike to scents coming in from outside and also to the scents of food, which pass up at the back of the roof of the mouth into the nose, and which, when we have not a cold, help to give our food half its flavor.

CAN POISONOUS SNAKES BITE WITHOUT POISONING?

Some can and some cannot. The way that poisonous snakes use their fangs to inject poison is one of the most wonderful things in nature, and in the case of some of them—for instance, the common adder or viper, which lives all over Europe—this poison fang and its venom are used only as a means of self-defense, or for getting food.

But the adder, as a rule, does not use its poison fang when it bites the animal on which it feeds, and so it has a very curious arrangement by means of which these fangs are laid flat back in the roof of the mouth out of the way of the ordinary teeth which are used for feeding. Thus, the adder can use one or other sets of teeth just as it likes when it wishes to kill its foe, and it can tuck its fangs securely out of the way and use its ordinary teeth when it wishes to swallow food. In most of the other poisonous snakes the fangs are fixed and cannot be used in this way.

WHAT IS A MIRAGE?

A mirage is an optical illusion, or deception. It occurs especially in certain conditions of the air when the air is very hot. Sometimes in deserts there are spots called oases, where there is water, and, as there is water, there are also green trees and shade. We are told that sometimes travelers think they are coming to an oasis only a few miles away, where they can get water and shade; and then, as they travel on, it disappears. A great explorer once "discovered" and named a mountain which did not exist, but which he had seen as a mirage.

But a true mirage is not an appearance in the sky due to nothing at all, and it is not pure imagination on the part of those who see it. When the traveler sees an oasis in the desert, and it fades and deceives him, what he has seen is the image of a real oasis, much farther on, below the horizon. The light from the real oasis has been reflected from a layer of air, as we see on page 1806, and the traveler sees it as if there were a huge mirror in the sky placed at such an angle as to give a view of the oasis to the traveler's eyes.

The reason of this is that there are layers of air of different temperatures, and therefore of different density, and whenever light passes from one thing into another of different density, part of it does not go on, but is deflected back. Appearances due to a similar cause are often seen at sea. A ship near the horizon may seem to have another ship, exactly like itself perched upside down upon it.

WHY DO EMPTY VESSELS SOUND MORE THAN FULL ONES?

In the study of sound we soon discover the existence of things which help to magnify a sound. The virtue of these things is that they resound, and so they are called *resonators*. The body of a violin is a resonator, and so are our chests and the spaces of the mouth and nose when we sing. If we play a violin from which the body has been taken away, the sound is weak and thin and ugly, and the difference between a violin worth $10,000 and one that is not worth $25 is to be found in the body, or resonator.

The whole point about a resonator is that the air inside it can be thrown by it into sound-waves. If there is no air inside it, of course its use is gone. An empty vessel is a resonator. If it is filled with fluid, it can no longer act; it makes far less sound, and the weight of the fluid quickly stops what sound it does make, acting like the dampers in a piano. If we were to fill the body of a violin with water, we should get the same results as if we held the body of a violin tightly in our hand when playing it.

DO ANIMALS KNOW WHEN THEY ARE BEING TREATED KINDLY?

Not even the wisest man can tell you how much animals know and how much they do not know, and it is still more difficult to say how much they can appreciate; but what we do know is that all the animals that man makes use of, or lives much with, can feel pain very readily, and are capable of great suffering. Whether they know they are feeling it is a different matter, much too deep a question for us here.

But the most important point about this subject is this—that whether animals appreciate kindness intelligently or not, it makes a very great difference to the human being who treats his animals well. No one who is cruel or unkind to animals will be kind to his fellow-creatures, and therefore we should always try to treat animals as kindly as one of ourselves, so that we may grow kind to all living things. This is one of the most important things we have to learn. When we are cruel or unkind we harm ourselves.

WHAT MAKES THE EARTH QUAKE?

The first reason that probably accounts for all earthquakes is simply that the earth is shrinking as it gradually loses the heat from its surface. We know that the earth has a thin crust, which is comparatively cool, and a very hot inside. The crust rests upon the inside of the earth, and as the inside shrinks it leaves parts of the crust unsupported, so that they may sink or crack. This will happen especially where the crust of the earth is thinner and more liable to crack than in other places. This is very common in Japan, for instance, and very rare in England. Not many years ago there were, within a few months, not less than a thousand small earthquakes in New Zealand.

But when an earthquake happens at any part of the earth it starts a wave of disturbance that travels right over the earth, and can be detected anywhere if we look out for it. Then, if we notice the time when the wave reached a place, and find out what the time was when it started, we can learn how quickly the earth-wave travels. But sometimes we cannot find out where the wave started, and then we can guess that it started under the sea; for earthquakes may start in the earth's crust where it forms the beds of great oceans as well as anywhere else.

WHEN I WALK IN A MOVING TRAIN DO I MOVE FASTER THAN THE TRAIN?

We ought to know which way you are walking. The answer to the question is yes, if you are walking in the direction that the train is going. But if you are walking from the front of the train to the back, then you are moving more slowly than the train. There can be no doubt about it, for you can prove it by experiment, that is, by trying.

If two of you got into the back of the train when it started, and one of you walked right through the train, if he could, to the front, then when the train stopped, he would get out on the platform much farther forward than the other. He would have traveled farther in the same time than his friend, and farther than the part of the train his friend was in, and thus farther than any part of the train. He has added his own movement compared with that of the train to the movement of the train compared with that of the earth.

The earth is moving too, and if the train is moving on the earth in the same direction as the earth is moving, then the train is moving faster than the earth. And if you are walking from the back of the train to the front, you are traveling faster than the train, and still faster than the earth. And if a fly is walking across your cheek from your ear to your nose, it is traveling faster than you, or the train, or the earth!

DOES THE BRAIN NEED FOOD?

The brain is made of nerves and nerve-cells. These taken together we call nervous tissue, and we know that nervous tissue is more richly supplied with blood than any other tissue in the body, not even excepting the muscle tissue of the heart itself. The blood carries the food materials, and nerve tissue has practically no reserve at all of food-supply in it. If the supply of blood is stopped for a moment, nervous tissue gives out sooner than any other tissue in the body.

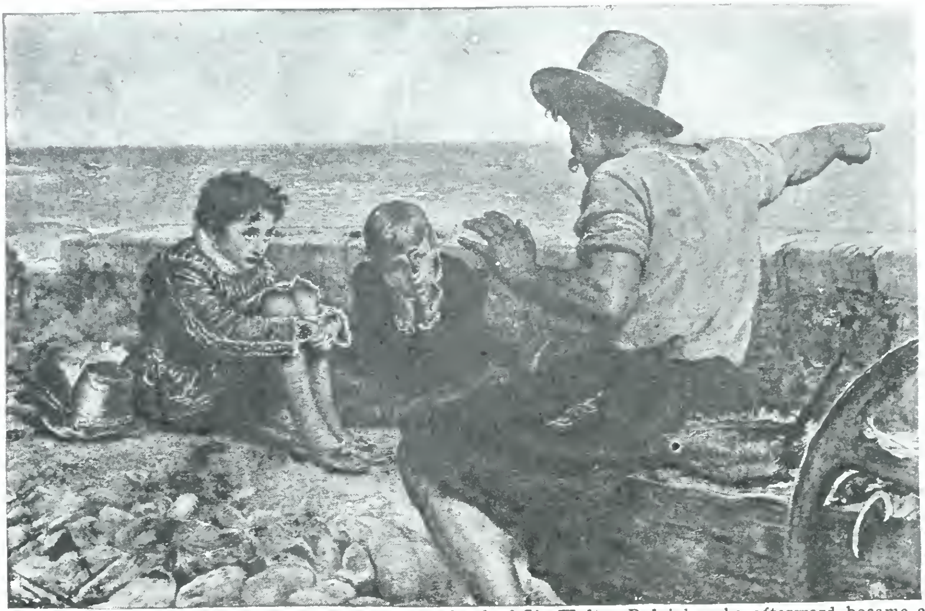
A simple and wonderful little experiment will show you this for yourself. The screen, or curtain, at the back of your eye, which receives the rays of light from everything you see, is made of nervous tissue. It is packed with blood-vessels. If you shut one eye and look out of the other, and then press your finger firmly on the open eye (pressing on it through the lid), in three or four seconds everything will grow quite dark. The eye is open and there is plenty of light, but it is quite blind. Move your finger away and in a second or two you will see again. The reason is that when you pressed on your eyeball you lessened the amount of blood in the screen, or curtain, at the back of the eye, and after about two seconds, during which it was using up what it had taken from the blood, it could do no more, and your eye became blind.

IS EVERY SEVENTH WAVE A BIGGER ONE?

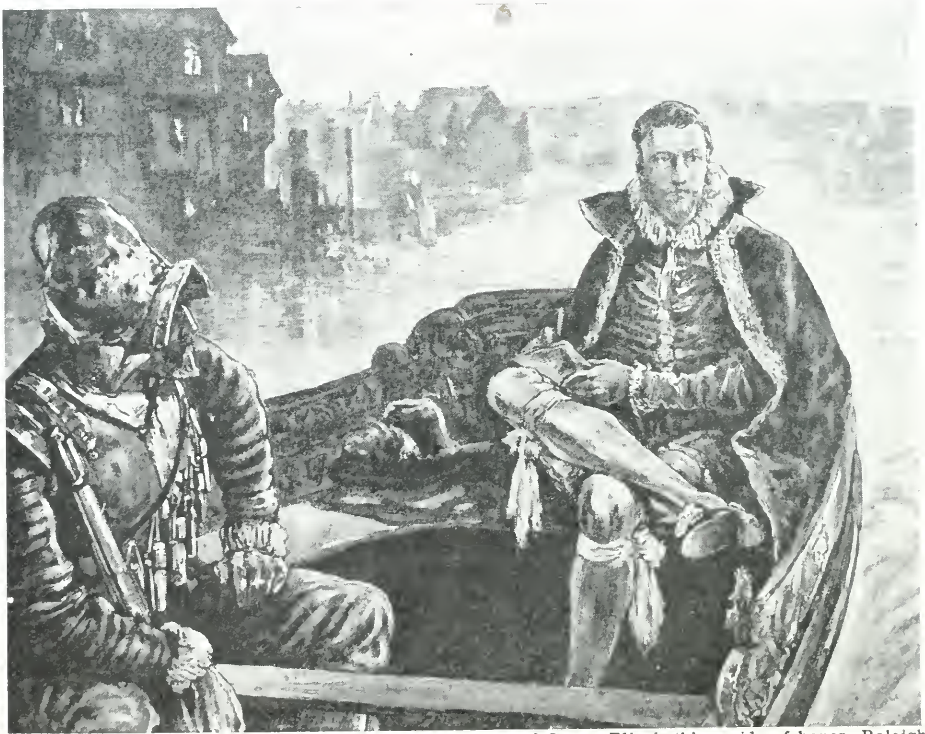
No. Another superstition we may add to this one which says that every third or every ninth wave, when the tide comes in, is bigger than the others. It is untrue and without any basis of fact. Most of these assertions about three and seven are nonsense, and are derived from long ago, when those numbers were thought to have some special value in nature.

THE NEXT WONDER QUESTIONS ARE ON PAGE 2121.

RALEIGH AS BOY AND MAN



There is something fine in this picture of the boyhood of Sir Walter Raleigh, who afterward became a great explorer and won many victories over the Spanish. He and a companion are listening to a sailor's tales of the wonderful lands across the ocean. This picture was painted by Sir J. E. Millais.



Because he fell in love with Elizabeth Throgmorton, one of Queen Elizabeth's maids of honor, Raleigh was sent to the Tower of London. Queen Elizabeth did not intend that he should receive royal favors, yet give his love to someone else. Sir Walter was kept a close prisoner for six months. Elizabeth Throgmorton was sent to another prison. Our picture shows Raleigh as he was taken to the Tower.

FROM HENRY VII TO QUEEN ELIZABETH

THESE pages tell us the story of three generations of life in Great Britain, when England was ruled by the Tudors—the family name of the ruling house from Henry VII to Queen Elizabeth. There were still troubles between kings and people, but the times of the Tudors were the beginnings of a great advance. Ever since the Normans went into England a constant stream of soldiers and traders, teachers and scholars had followed from other lands, and the people learned more and more of other countries and peoples. Great sailors and discoverers sailed the seas, and there was a great growth of the trade which has helped so much to make the nation prosperous. Yet there were still tyrant kings, and the nation was to pass through many trials and calamities; and even the developments that took place in the reign of Elizabeth can hardly make one forget the crime and wickedness which come into this part of our story.

THE TIMES OF THE TUDORS

AS one mounts the steps leading to the chapel of Henry VII in Westminster Abbey, he seems to pass into a new England. The decorations of the chapel, particularly those on the beautiful gates, form a sort of link between the old and the new. The dragon of the last king of the old Britons takes one back to the beginning of English history.

The lilies of France and the lions of England remind us of the long connection and long struggles of the two countries. The crown on a bush recalls the story of Henry's hasty coronation on the battlefield of Bosworth, where Richard died in the thickest of the fight, and his crown was found hanging on a hawthorn tree. The Tudor roses are everywhere, formed of red and white roses, badges of the two parties in the long civil wars.

When you have admired the roof, the windows, the carved stalls, you will turn to the large tomb within a screen, planned by Henry himself, in which he and his wife both rest. Elizabeth, sister of the little boys murdered in the Tower, was the first to be buried in her husband's splendid new chapel. The figures on the black marble tomb are both portraits.

A fine portrait, too, is that of Henry's mother, Margaret Beaufort, in the south aisle of the chapel. It was through his mother that Henry claimed his right to the crown, and as you look at her calm, thoughtful old face, her delicate hands raised in prayer, think of her as one who loved and helped the poor, as the friend of Caxton, the printer, as the foundress of colleges at Cambridge. Of her the famous words were said: "Everyone who knew her loved her, and everything that she said or did became her." Two of the badges on Henry's gates belonged to his mother: one is the root of daisies, the other is the portcullis, a sort of sliding door, used in old times to hang over the gate of a castle, and add to its strength and security.

During the lifetimes of Margaret, her son, her grandson and his three children, the need for strong gateways and portcullises passed away. The old feudal barons who used to sally forth from castles shut in by moats and gates to put themselves at the head of their knights and servants were nearly all killed off in battle during the Wars of the Roses. The nobles who rose in their stead built themselves open country houses, surrounded by parks and gardens which are still among the chief beauties of England.

The old barons, though some were

bad and violent, had done a great work for their country. It was they who wrung from the kings charter after charter promising justice, good laws and just government for the people. It was they, too, who insisted on the kings calling Parliaments to make the laws, and to decide what money should be paid in taxes and how it should be spent.

THE TUDOR KINGS WHO STOPPED THE GROWTH OF FREEDOM

Now, when the order of strong old nobles was laid low, the new ones owed so much to the Tudor kings that they did not dare to resist them at first, and, as the character of this very clever family was strong and determined, the growth of freedom was stopped for many years.

Henry VII was very grasping about money; he needed it badly and made people angry and discontented by the way he forced it from them. He had a hard task to set England straight and to keep it at peace. He saw that nothing could improve if fresh wars were undertaken. So he tried to pacify Scotland and Spain by marrying his children into their royal families. He little thought how far-reaching the results of these marriages would be. His daughter Margaret, named for her grandmother, was married to James IV of Scotland, and his eldest son, who died young, to a Spanish princess, Catherine of Aragon.

To understand how great a change came about in the world in the times of the Tudors, we must go back to the beginning of the country's story, when the nation was still young. No one then knew anything about the shores of the other side of the sea which lay round about them. Then, as time went on, glimpses of the empire beyond, of which they formed a part, came to the Britons when conquered by the Romans. The Saxons and Danes, from the other side of the North Sea, handed on in their new home the tales of the wild and cold motherland they had left.

THE STREAM OF SOLDIERS, SAILORS AND SCHOLARS THAT WENT INTO ENGLAND

The influx of the Normans sent a never-ending stream of soldiers and traders, teachers and scholars, constantly crossing and recrossing the Channel. The views gained through them of the continent beyond were ever made larger and clearer, as the Crusaders pressed on to the East, armies spread all over France, and trade steadily increased. All this time, up to the reign of Henry VII, England was slowly learning more about the earth.

There were some very wise men through the centuries who understood that the world was not really flat. One of them had even found out a way to measure its size and weight. There were also some very adventurous men who had from time to time sailed away toward the Unknown and come back with tales of what they had seen. Columbus and his friends showed a new world to the old, as they returned, voyage after voyage, with news of what they had seen at the end of "Nowhere," at the "Back of Beyond."

The excitement of this new wonder, the longing to know more about it and to share in the riches and glory of the discoveries spread all over the times of the Tudors in the fifteenth and sixteenth centuries.

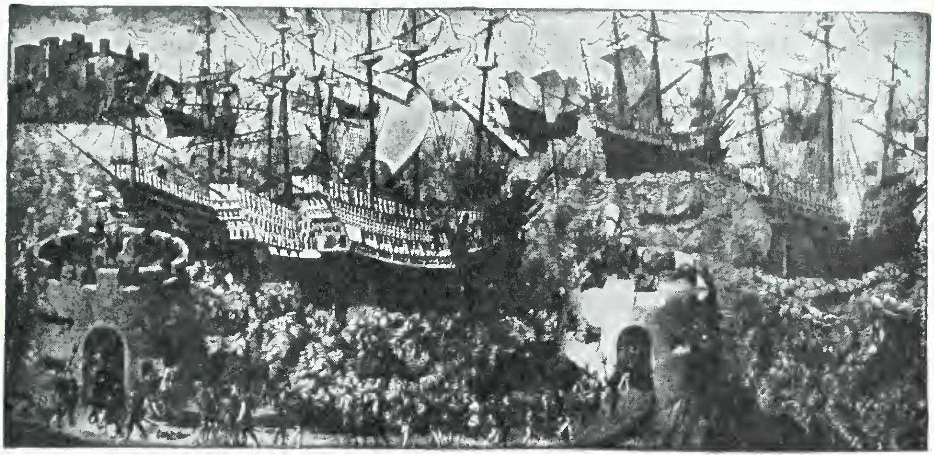
THE BLACK CLOUD THAT HANGS OVER THE TIMES OF THE TUDORS

Men's minds were still further awakened in these days by the opportunity that came to them to study, in the beautiful old Greek language, the learning that had been hidden away and neglected for long years. There was a new learning to delight scholars, as well as a new world to astonish the people. There was a new form of religion, too. It began with Wyclif and his translation of the Bible, and men thought about it a long while, trying to decide what was wrong in the old form of religion, and how things could be put right.

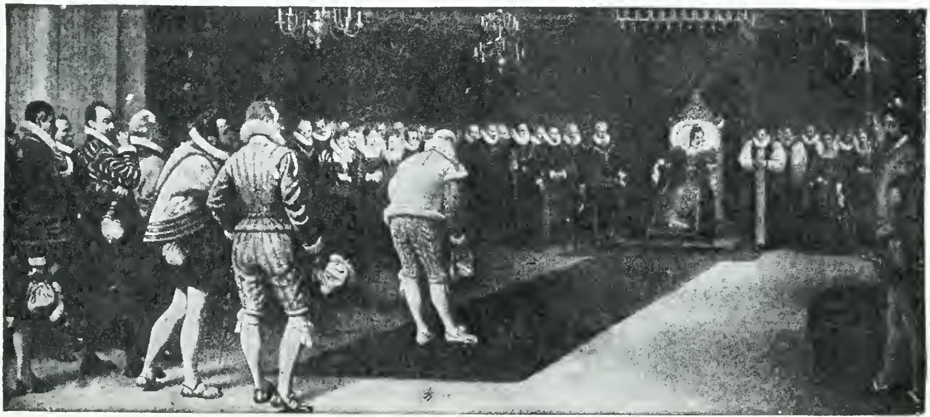
Presently, as we shall see, people had to do more than think—they had to act. We who live in this twentieth century, when everyone is free to worship God as he thinks right, find it hard to understand that only four centuries ago men believed they were pleasing God by putting people to death if they refused to agree with them. The sadness of the religious struggles in those days hangs like a black cloud over the times of the Tudors.

Catherine of Aragon's bridegroom, Arthur, died before his father, and the pope was asked to say that it would be right for her to marry her brother-in-

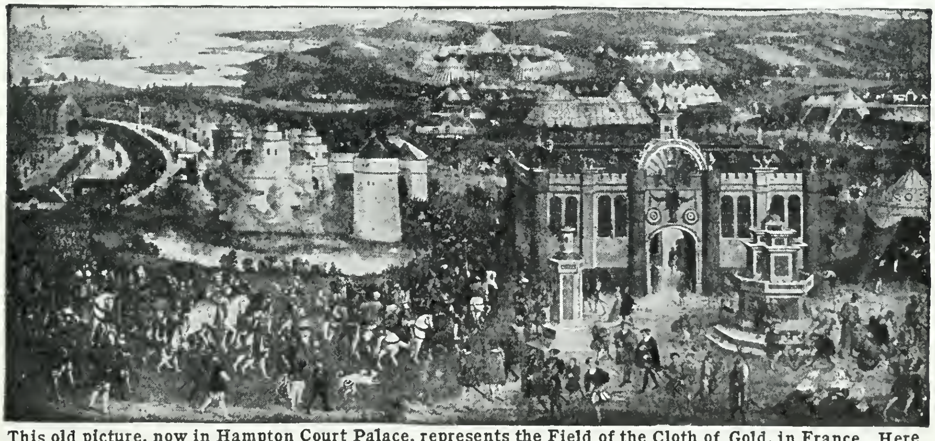
ENGLAND'S GOLDEN AGE OF PAGEANTRY



The warships used in the days of Henry VIII were very different from those of our own time. The steamship had not been invented, so they were all sailing vessels, and they stood high out of the water, with port-holes for small cannon. Here Henry VIII is seen embarking at Dover for Calais.



In this picture we see Queen Elizabeth seated on her throne and surrounded by her court, receiving the French ambassador after the terrible murder of the Protestants on St. Bartholomew's Day, 1572. All the court wore mourning to show the nation's horror of this deed. The picture is by Mr. W. F. Yeames, R.A.



This old picture, now in Hampton Court Palace, represents the Field of the Cloth of Gold, in France. Here, in 1520, Henry VIII met King Francis I of France, and the magnificence displayed caused the place to be called the Field of the Cloth of Gold. There were nearly 3,000 tents, many of them covered with cloth of gold.

[illegible] afterward Henry VIII. He was a tall, stout, fair man, who wore a flat velvet cap, very handsome clothes with puffed-out sleeves, and shoes with broad toes. He had great quarrels about the number of his wives.

Let us fancy ourselves in the Tudor Room at the National Portrait Gallery in London, and there study the faces of Henry VIII and his family, and of those with whom they spent their lives. The figure of Henry VIII is quite lifelike. If you look closely, you will see in his face the self-will and self-pleasing that spoiled the promise of his young bright days, when he came to the throne.

Catherine of Aragon, his faithful wife for twenty years, hangs near, in her Tudor head-dress and square-cut bodice. Overhead, in the bright red of a cardinal's dress, is Wolsey. Henry heaped presents upon him for many years, and they were most intimate friends. Wolsey encouraged Henry to rule without Parliament, and gathered all possible power into his own hands, so that he might make the king supreme.

HENRY GIVES UP HIS WIFE AND HIS GREAT COUNSELOR WOLSEY

When Henry became tired of Catherine, he wanted the pope to say that she was not really his wife, because she had been his brother's wife first. This the pope refused to say, and at last Henry made up his mind not to consider the pope as the head of the Church any longer, but made Parliament declare that he should be the head. But Wolsey was against his marrying Anne Boleyn. Henry, in anger, took Wolsey's high offices from him, and he died in sorrow and disgrace. Shakespeare has written of him in a great play, and has reminded us that some of Wolsey's last words are said to have been these: "Had I but served my God as diligently as I have served the king, He would not have given me over in my gray hairs."

Thomas Cromwell was the next favorite of the king, and for ten years helped Henry to sweep away the old freedom of the country. People were made to pay taxes as the king and Cromwell chose; these two made what laws they pleased, and imprisoned anyone they wished; they even beheaded some of the noblest of the land who dared to oppose them.

HOW SIR THOMAS MORE WENT TO HIS DOOM IN THE TOWER

Look well at the earnest face of Sir Thomas More: he was one of the greatest Englishmen of the day, and for a time a close friend of the king. Henry used to walk with him in his garden by the riverside at Chelsea with his arm round his shoulder. Other friends loved to visit him there, too, and talk of the new learning and of the book More had written, trying to show how best to help the country and teach the people. But there came a time when he could no longer walk familiarly with the king; he felt it impossible to say that he thought it right that he should have married Anne Boleyn. So we sadly watch him go down the steps into his boat, having shut the gate on the children he so dearly loved, and pass along the Thames, so clear and silvery then, on his way to the Tower, where he was beheaded.

Those who traveled much about England during the next three years saw many strange and sad sights. The king's men were met on the high roads, carrying beautiful embroideries hanging from their saddles; the sounds of hammering and smashing were followed by bonfires in the fields, for the order had gone forth that the monasteries were no longer to exist. The monks and nuns were turned out from the buildings, now spoiled of their treasures and ornaments, and in many cases left to go to ruin. These monks and nuns had led useful lives in the past.

THE MONASTERIES THAT SHELTERED THE SCHOLARS IN STORMY TIMES

You will remember how useful they had been in the past; how they had sheltered in stormy times the scholars who wrote and painted the manuscripts from which we can glean so much of the early history of the country. Besides teaching those who wished to learn, they entertained travelers and looked after the poor. But because some of the monks were lazy and bad, this was made an excuse to shut up all their houses and take away the estates and other property that belonged to them. Henry gave some of his wealth to his friends; some was spent in founding new bishoprics; some went to build schools and colleges and ships.

In the midst of all this scene of change

Henry's son, Edward, was born at Hampton Court, the beautiful palace which once belonged to Wolsey. It is open now for all who wish to see it, and is full of memories of the king, who played tennis in the fine court and sauntered about this lovely riverside and park over 300 years ago. Edward's mother, Jane Seymour, died soon after he was born. After this, Thomas Cromwell displeased Henry and was sent to prison and beheaded. Great efforts were made in the time of Henry VIII to subdue the rebellious lords in Ireland and to make the people obey English laws, and even alter their customs and religion to order. This they hated doing, and discontent smoldered on in the beautiful and unhappy sister-island.

Edward, sickly and pale, succeeded his father when he was nine, being crowned by Archbishop Cranmer, who arranged the Book of Common Prayer much in the same order as it is to-day.

THE FIRST BLUECOAT BOYS WHO WALKED THE STREETS OF ENGLAND

As Edward was too young to govern by himself, the affairs of the country were managed by his guardians. There was much distress in the country, for the people had not enough work, and they missed the help they had had from the monasteries. Much more of the land was now used for grazing sheep, as the new owners wanted to get rich by selling the wool. When the land was tilled, many more people could find work. Another trouble was that the new landlords inclosed some of the old commons, where the people had had rights ever since the days of the Saxons. They felt this terribly, and in many places there were riots.

The Bluecoat School was founded by Edward VI, and many other schools all over the country. The long coats, bands and yellow stockings were the ordinary boy's dress in this reign, so in London to-day if one sees a Bluecoat boy in the street he may fancy he is looking at the schoolboys of 300 years ago. In his portraits the young king, with his rich clothes, looks something like a small copy of his father. Edward's health became worse and worse. When the ships of Willoughby and Chancellor were towed down the Thames on their way to open up trade with Russia at Archangel, the courtiers rushed out of the palace at Greenwich to see them pass and to receive the salutes of the sailors in "sky-colored cloth." Edward heard the cannon from his bed, and when Chancellor returned it was his sister Mary who received him and his sailors as queen of England.

THE SAD FIGURE OF LADY JANE GREY AND THE COMING OF MARY

Edward had been persuaded to make a will leaving the kingdom to his cousin, Lady Jane Grey, who was a Protestant. The rightful heir, Mary, clung earnestly to the old ways. Poor Jane had no wish to be queen; she was forced into it. You will like her gentle sweet face. She worked hard with her tutor, whom she dearly loved. He was kinder than her parents, and at sixteen she knew much Latin and Greek.

There are several of her books and letters at the British Museum. One of these is signed "Jane the Queen." Her short reign was passed in the Tower, where she and her young husband were afterward beheaded. One of her books shown is believed to be the prayerbook she used on the scaffold.

Mary's girlhood had been sad and lonely for the most part, and after she became queen she had the sorrow of being married to a husband, Philip of Spain, whom she dearly loved but who cared nothing for her. He spent but little time in the country, but could persuade Mary to do anything he pleased. Together they did all they could to stop the progress of the Reformation and to bring England back again under the power of the pope.

HOW THE ENGLISH PARLIAMENT KNELT DOWN TO BE PARDONED BY THE POPE

Mary's cousin, Reginald Pole, in the red dress and hat of a cardinal, was sent by the pope to receive the submission of England. Try to imagine him going up the Thames, in a state barge, a gleaming cross at the prow, to Westminster. There the whole Parliament knelt down to receive from him the pope's pardon for what had happened in the reigns of Henry VIII and his son. Mary was happy to think the old faith was restored.

Numbers of men and women, during this and the reign of Elizabeth, were put to death because they dared to keep to what they believed to be right in religion and refused to change at the bidding of those in power.

In the midst of all this misery—and who was so wretched as Mary herself?—England lost Calais, called then "the brightest jewel in the English crown." It was the last of the British possessions in France, and the loss was a heavy blow to the country and to Mary, who died soon afterward.

QUEEN ELIZABETH, WHO LOVED FINE CLOTHES AND FINE LEARNING

We come now to Queen Elizabeth. What grand clothes, with tight bodices, huge sleeves, and uncomfortable upstanding ruffs, she wore! What a wealth of blazing jewels, chains and ornaments! What a hair-dressing! One can well believe the stories of the numbers of dresses she possessed, and the time and thought spent on her toilet.

Elizabeth's learning and love for books were as remarkable as her love of fine clothes. Among the Royal Books is one of prayers composed in English by Elizabeth's stepmother, Queen Catherine Parr. This book is translated by Elizabeth into Latin, French and Italian, all written in her own hand when she was fifteen. Later she replied in Greek to the addresses at the universities, and appreciated to the full the writings of the men who made her reign so great and famous.

HOW SHAKESPEARE STOOD TO WATCH THE MERRYMAKING OF THE QUEEN

There are many beautiful houses still standing, though some are in ruins, where Elizabeth made merry with her court, for she delighted in going about to pay visits. Can you fancy the rush of countryfolk to see the gay party pass? For the gentlemen wore clothes as smart as the ladies, and the coaches were gilded and painted, and the horses had fine trappings. No wonder these "progresses" helped the people to know and like their gay young queen. It is said that Shakespeare came from his home near by, and, standing among the crowd, saw the acting and shows that went on for days.

On the left side of Elizabeth's portrait in the National Portrait Gallery, the thoughtful gray eyes of Burleigh look steadily at us. The queen had to face many great difficulties all through her long reign, and Burleigh was one of the faithful and good advisers who helped her to put an end to the quarrels about religion, and to keep at peace with other countries as far as possible.

A portrait of another of her friends hangs near the queen's, that of Sir Walter Raleigh, of whom the story is told that, when walking with the queen, he put down his beautiful cloak over a muddy place, so that she could pass over without harm.

All through her reign Elizabeth had troubles connected with Scotland. Henry VII had married his daughter Margaret to James IV of that country. When James was killed at Flodden, his queen ruled for her little son James V till he was grown up. There is a most interesting letter from Catherine of Aragon to her husband, Henry VIII, then away in France, telling him of the victory at Flodden, and sending him part of James's coat for a banner. James V died early, too, and sadly left his kingdom to his "little lass," Mary Stuart, whom England knew so well as Mary Queen of Scots.

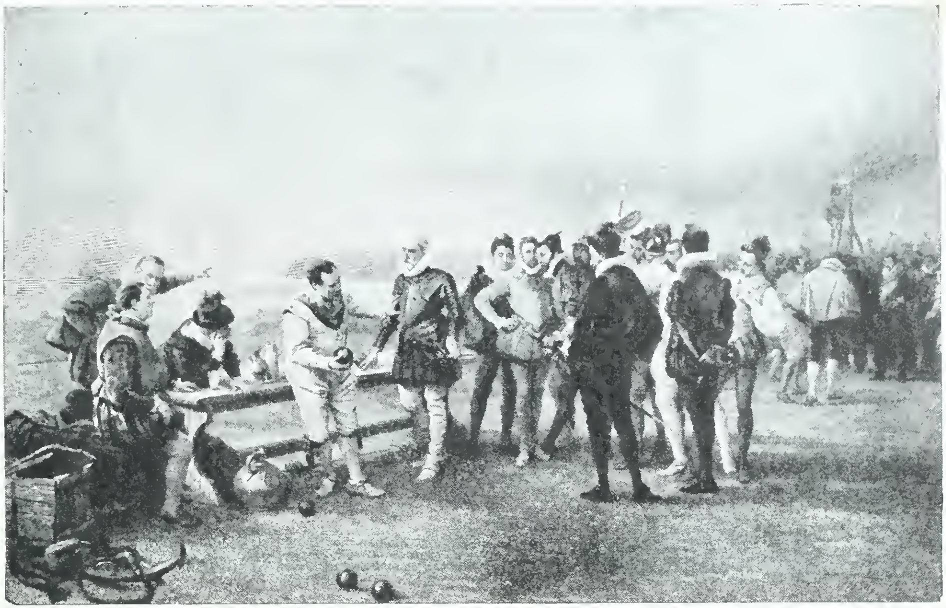
THE QUEEN'S COUSIN, WHO LEFT A THRONE TO DIE IN A TOWER

Scotland in those days was torn in two, like England, between those who followed the pope and those who did not. Those in favor of him sent little Mary to France to be brought up there, and to marry the French king's eldest son. There is a portrait of Mary in white widow's mourning. Her young husband soon died, and Mary sorrowfully left the gay court of France and went back to very hard and troubled times in her own kingdom. She was one of the most beautiful women of her time, and had such charming manners that most people were eager to please her. She married her cousin, Darnley, and their little son became James VI of Scotland.

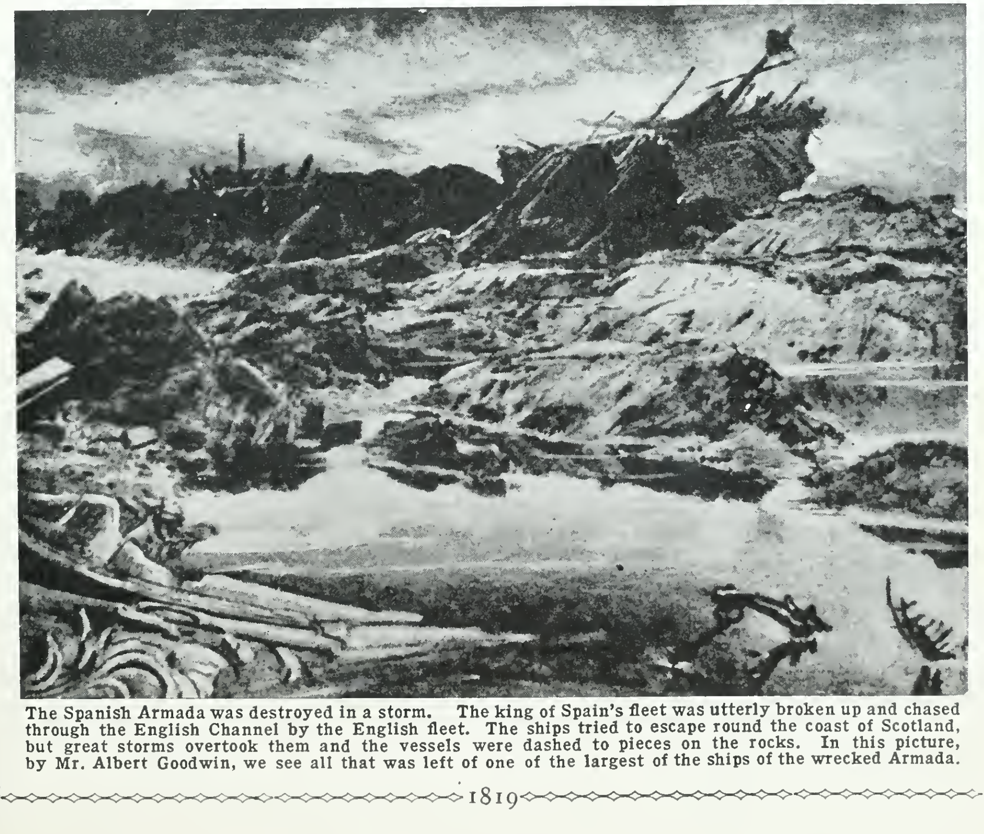
There is still to be seen a letter from Mary, in French, to Elizabeth, asking for more liberty, and for leave to write to her son, who, she says, was torn from her arms. What had Elizabeth to do with it? And why was the boy away from his mother? It is a long, sad story, and gets sadder and sadder to the end.

Mary had many quarrels with her subjects, the chief one being that they believed she had something to do with the murder of her husband, Darnley.

A GAME OF BOWLS & WHAT FOLLOWED IT



Sir Francis Drake was one of the great sailors of Queen Elizabeth's time. When the Spanish Armada, the great fleet Spain sent against England, was sighted, Drake and his officers are said to have been playing bowls at Plymouth. "There is plenty of time to finish the game and beat the Spaniards too," said Drake. This picture, painted by Mr. Seymour Lucas, R.A., is printed by courtesy of Messrs. Henry Graves & Co.



The Spanish Armada was destroyed in a storm. The king of Spain's fleet was utterly broken up and chased through the English Channel by the English fleet. The ships tried to escape round the coast of Scotland, but great storms overtook them and the vessels were dashed to pieces on the rocks. In this picture, by Mr. Albert Goodwin, we see all that was left of one of the largest of the ships of the wrecked Armada.

Presently she fled to England, and Elizabeth kept her a prisoner in various castles for the rest of her life.

During these long years plots were always going on to make Mary queen instead of her cousin Elizabeth. At last, when it seemed to be certain that Mary was joining with those who tried to kill Elizabeth, Elizabeth condemned her cousin to be beheaded. This was a great grief to those who loved her, but her death removed the only possible centre for a Catholic rebellion in case of a Spanish attack. Mary left her claims to the English throne to Philip of Spain.

THE GREAT WEALTH AND THE GREAT CRUELTY OF SPAIN

A year after Mary's execution, England passed through a great and most exciting time. Soon after Elizabeth became queen, Philip, her brother-in-law, had wanted her to marry him, so that England and Spain might join against France. Spain was very powerful then, because she possessed the Netherlands, so rich from commerce in the wool trade, in which England had a share. Spain had, too, the wealth brought by the splendid discoveries of Columbus in the New World. But Elizabeth would not listen; she helped Philip's Protestant subjects in the Netherlands, and Philip in return helped Mary's plots against Elizabeth. The English hated the Spaniards at this time for their cruelty to the Protestants, and also because they tried to keep England out of all the trade they could in the New World. Sailors, such as Hawkins and Drake, pounced on the Spanish treasures when they could, either on shore or at sea, and at last Philip determined to add England to his other dominions by conquest.

HOW SIR FRANCIS DRAKE FINISHED HIS GAME AND BEAT THE SPANIARDS

The story goes that Drake and his captains were playing bowls on Plymouth Hoe when news came that a huge fleet was slowly coming up the Channel, to help to land a great army of Philip's from the Netherlands.

"There is time to finish the game," said Drake, "and beat the Spaniards, too."

Philip had counted on help in England, but he was mistaken, and all flew to arms for queen and country. Ships poured out of every harbor as the Armada sailed in a broad crescent up the Channel. Elizabeth, on horseback, reviewed her troops at Tilbury, encouraging her captains and men by her presence and her speech.

"I know," said she, "that I have but the body of a weak and feeble woman, but I have the heart of a king, and of a king of England, too."

The motto on the medal struck in honor of the great victory and deliverance that followed tells the story of what happened in a few words: "God blew with His wind, and they were scattered."

The great ships of the enemy were slow and helpless and got in each other's way; while the little "sea hawks" of the English darted in and out, and drove the Armada out to sea by sending fire-ships among them, so that they fled away to the North Sea in a terrible storm. Those that were not wrecked escaped round the north of Scotland and west of Ireland. To this day there are traces here and there along the coasts of the disastrous retreat of the Spanish Armada.

THE END OF ELIZABETH'S REIGN AND THE END OF THE TUDORS

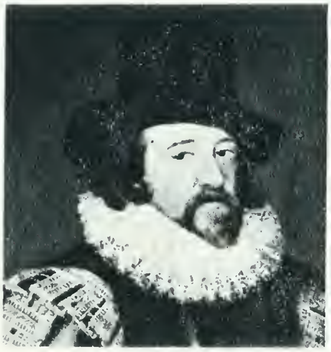
Try to imagine the relief and joy of the country, the ringing of bells, the bonfires, the thanksgiving! For thirty years the terror of Spain had hung over it, and now that power was laid low, and England became of real importance among the countries of Europe.

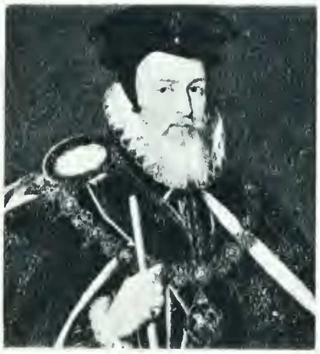
Poor Elizabeth! Notwithstanding all the greatness and glory of her reign, the excitement of discoveries, the satisfaction of success, when the end came it found her a lonely, sad old woman. Most of her friends died before her. She had neither husband nor child to care for. She had never seen Mary's son, who was to succeed her, but she wrote to him two months before her death, begging him not to believe some charges brought against her. She signed herself, "Your loving and friendly sister, Elizabeth."

This was in January. Late in March a rider sped north on relays of horses, night and day, to be the first to tell James Stuart, the king of Scotland, that he was also king of England. The times of the Tudors were ended; the Stuarts had come.

THE NEXT STORY OF ALL COUNTRIES IS ON PAGE 1913.

GREAT FIGURES IN TUDOR DAYS


FRANCIS BACON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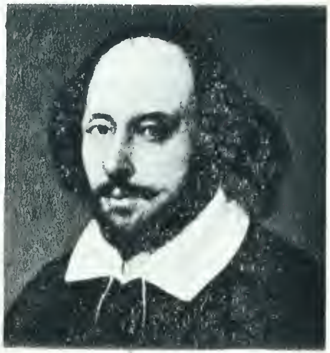
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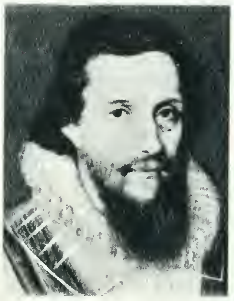
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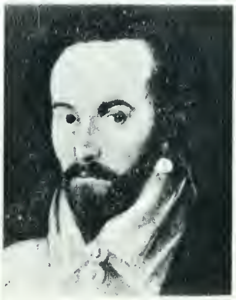
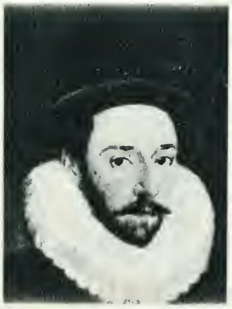
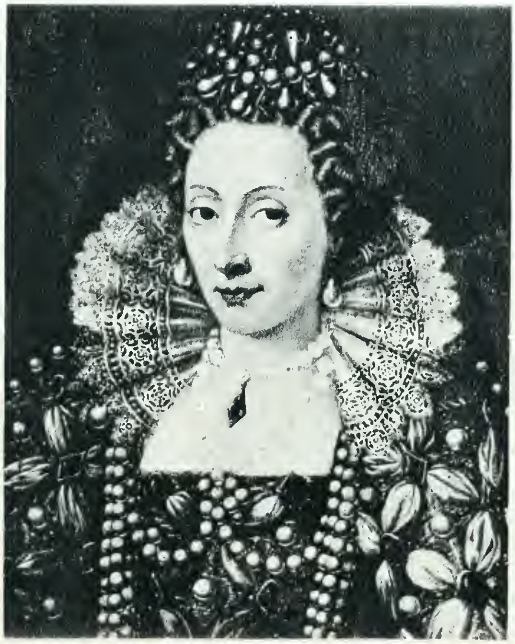
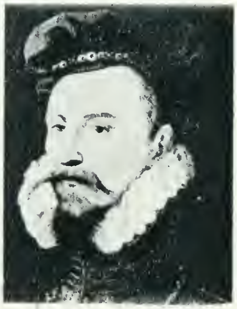

SIR WALTER RALEIGH


SIR FRANCIS DRAKE


QUEEN ELIZABETH, BY ZUCCHERO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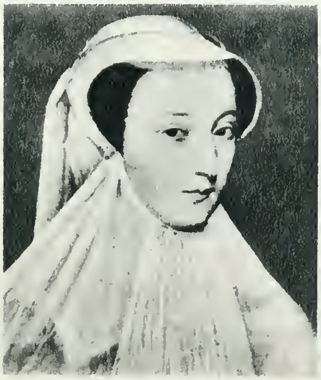
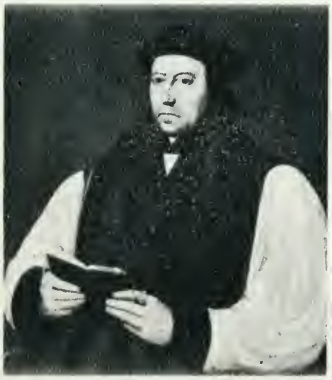
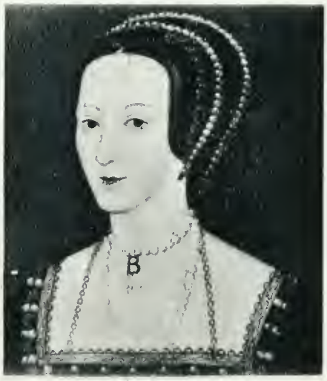
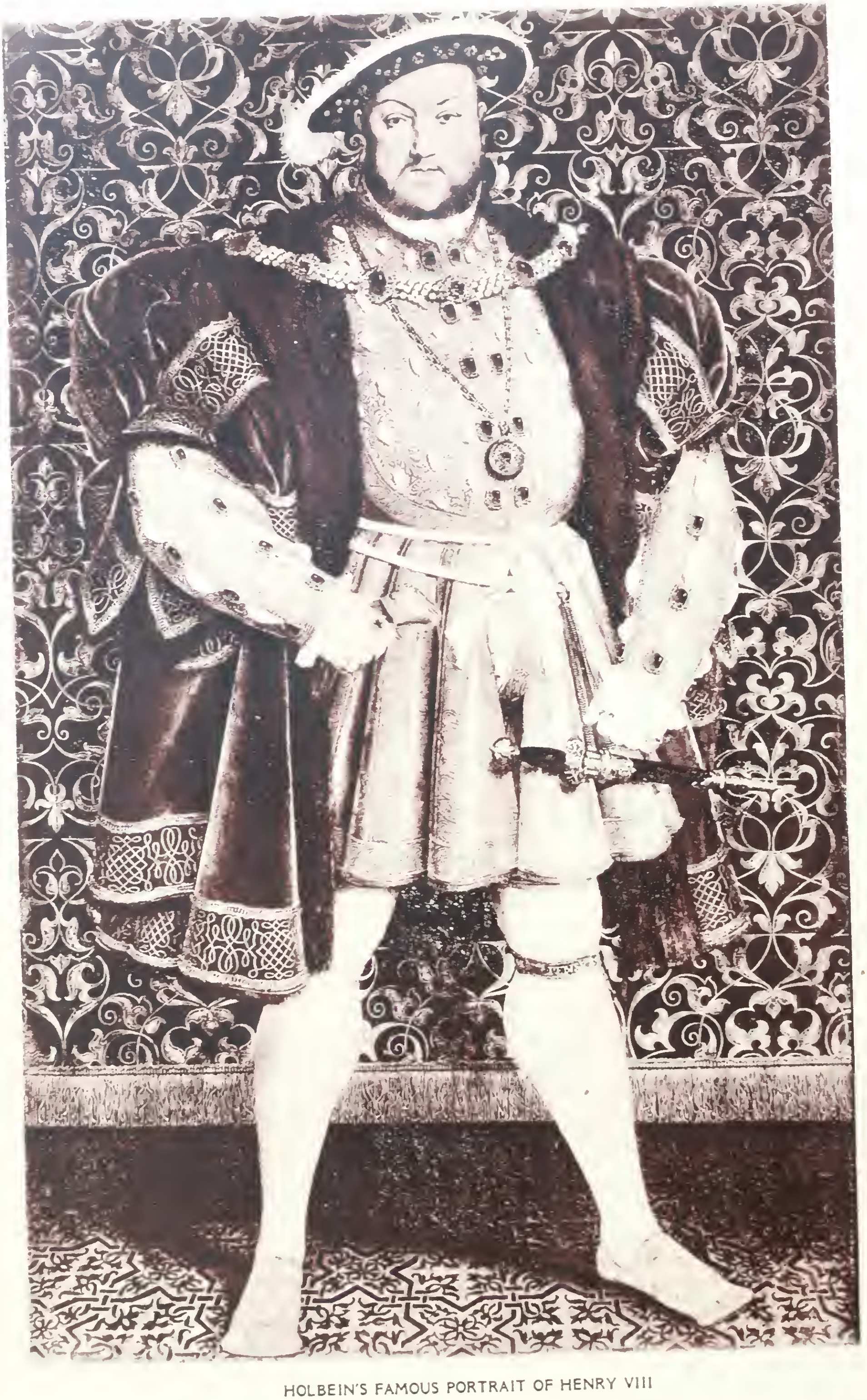
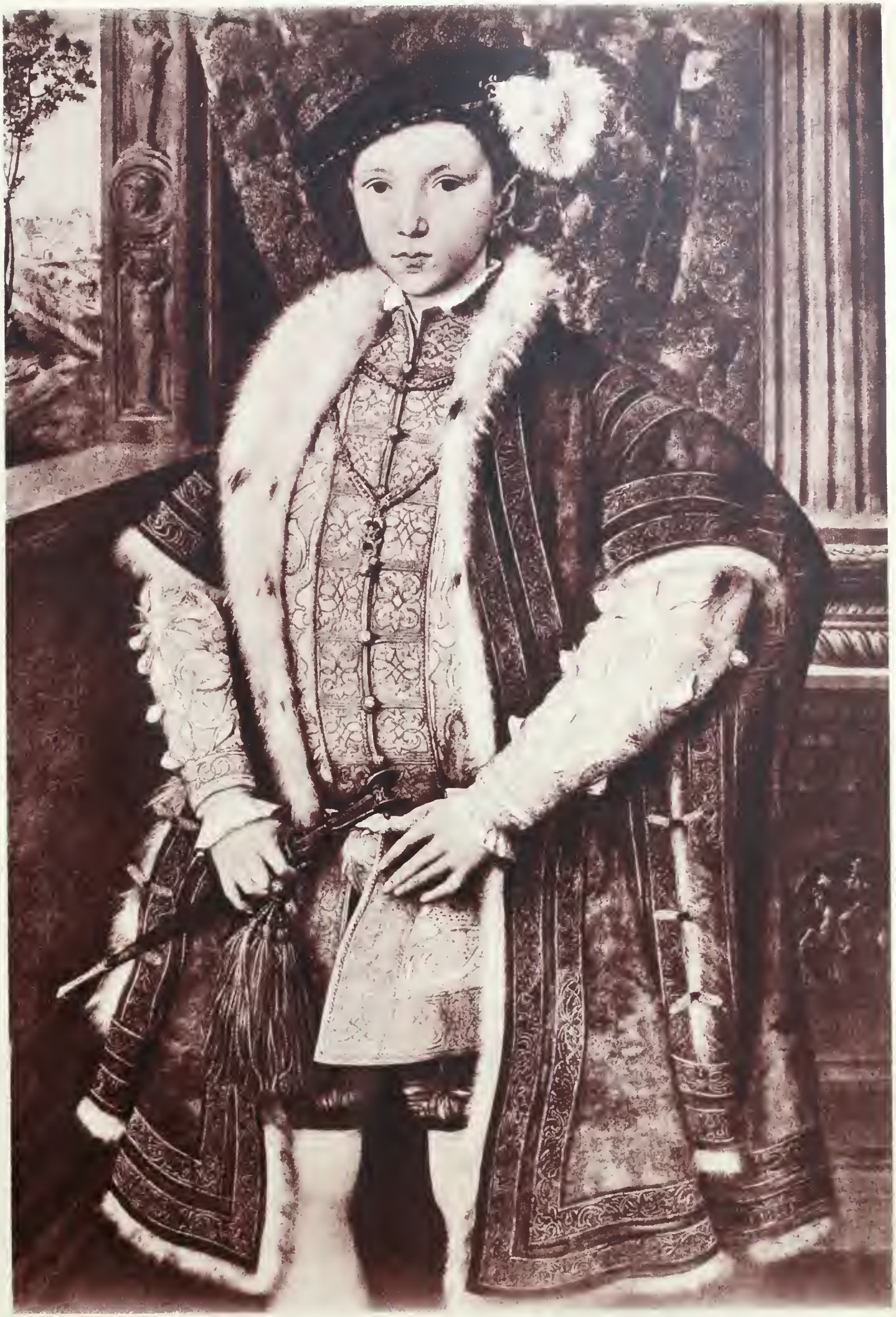

MARY QUEEN OF SCOTS


THOMAS CRANMER

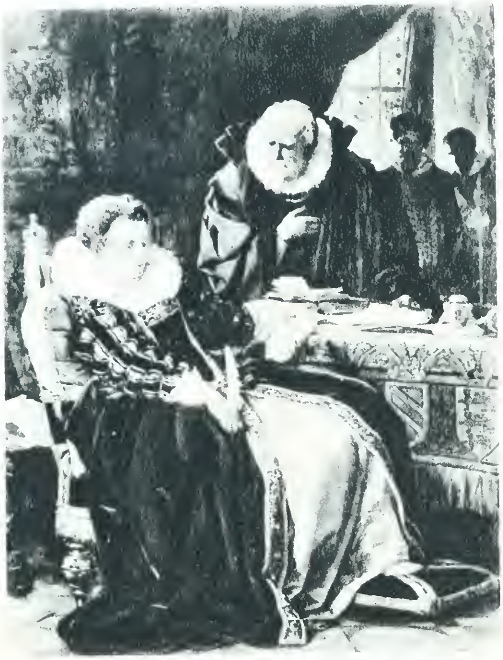

ANNE BOLEYN



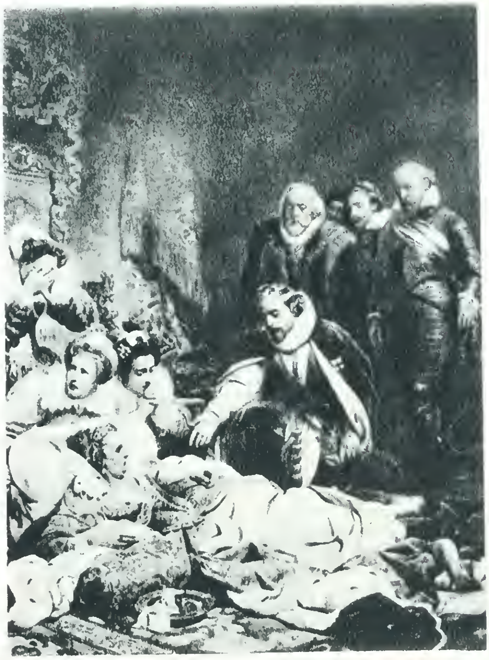
HOLBEIN'S FAMOUS PORTRAIT OF HENRY VIII



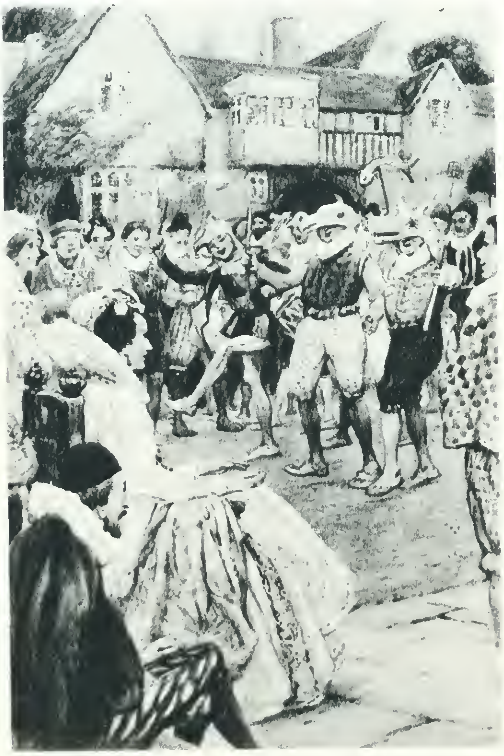
THE BOY KING, EDWARD VI, BY HOLBEIN



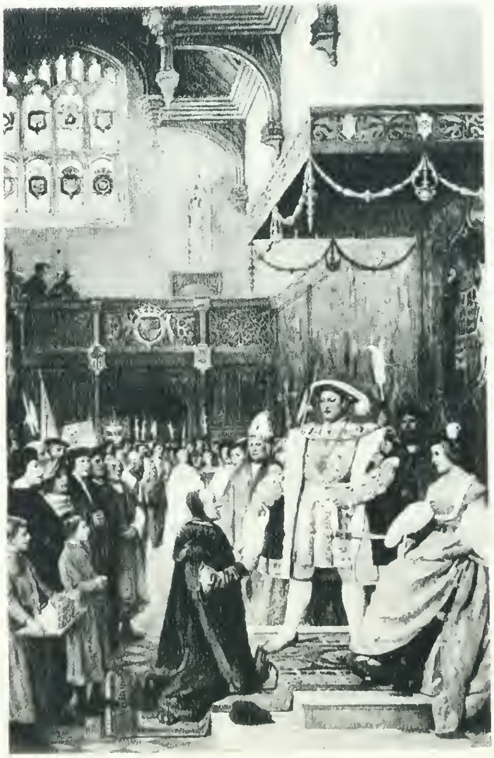
QUEEN ELIZABETH SIGNS THE DEATH WARRANT OF MARY QUEEN OF SCOTS, BY JULIUS SCHRADER



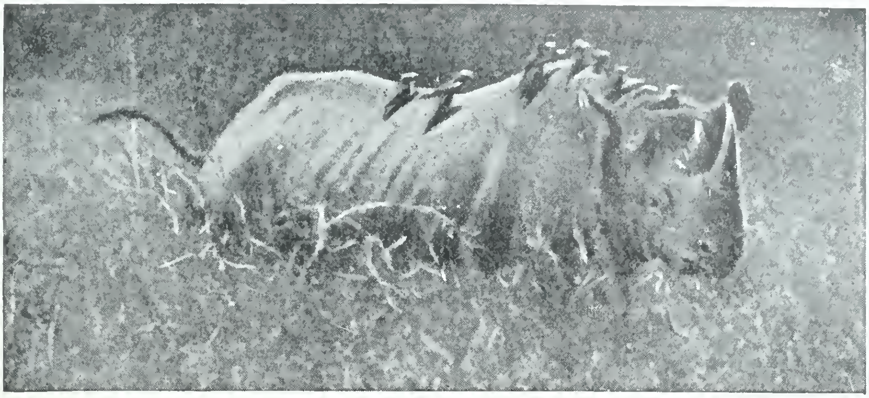
THE LAST HOURS OF QUEEN ELIZABETH. FROM THE PAINTING BY PAUL DELAROCHE



QUEEN ELIZABETH MAKES MERRY WHILE RALEIGH LANGUISHES IN THE TOWER

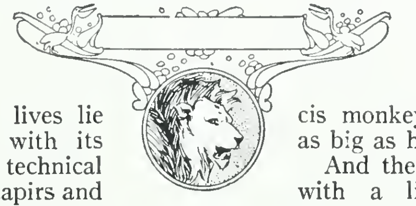


THE FOUNDATION OF ST. PAUL'S SCHOOL BY KING HENRY VIII



Rhino-birds on a black rhinoceros in East Africa.

THE TAPIR AND THE RHINOCEROS



DOES it seem a strange partnership, this of tapirs and rhinoceroses? Indeed, their lives lie apart. But Science, with its hard names and its technical processes, shows that tapirs and rhinoceroses are related. The two families are akin on the one hand to the swine, and on the other to the horse group. Tapirs and rhinos are really fascinating beasts. The rhino is a highly finished product of the past. He is a sort of moving fortress. Ages and ages later, men made armor of mail and steel for soldiers and their horses.

The tapir fixes our attention for different reasons. He is an astonishingly ancient mammal. The fossils show that the ancient tapirs had five toes on each foot. The modern ones have four toes to each forefoot and three each to the hind feet. These make a beautifully formed series of hoofs for swift progress in grassy undergrowth, and for safe passage over treacherous marshy ground. But the physical feature of the tapir which most appeals to the fancy is its long flexible proboscis—its trunk-like nose.

It is curious how Nature repeats herself. There is a shrew which has a relatively enormous snout, so that we call it the elephant shrew. There is a huge seal with a colossal development of the nose justifying the name of elephant seal. There is the proboscis monkey with a snout half as big as his face.

And then we have the tapir, with a little trunk, several inches in length, hanging down from the fore part of the upper jaw and covering the under jaw; a lithe, active little trunk with the nostrils at the end, highly charged with nerves and blood-vessels; a trunk which waggles and twitches, which whistles and sniffs, snorts and grunts.

A STRANGE CREATURE OF THE AGES AND ITS QUEER TRUNK

The feature is quite useless, we should imagine. It has not the finger-like power of the real trunk, which can pick up a pin or a pine tree; it has not the rooting ability of the snout of the boar; and it is certainly not more acutely alive to scent than the handsome nose of a deer or the grand muzzle of a lion. It must at times be an actual hindrance to its owner in getting food. But there it is, a growth of countless years.

We can see the tapir in most zoological gardens—there are good examples in New York—and when we do, the occasion is one to sit down and stare. For we behold an animal whose like has roamed the world little changed for a period of time immeasurably vast compared with human lives. The tapir has undergone as little modification as, perhaps, any beast that survives in the world to-day.

THE UNCANNY TAPIR, A CHAPTER OF VERY ANCIENT HISTORY

At the first glance we realize how weird and uncanny a creature it is—the tiny eyes, the small brain-space in a formidable head, the strange leathery coat, the blackish color of which will rub off on our hands as we touch it. There before us is a poor brute which has withstood the assaults of time. See how the cattle, deer and antelopes have changed. See how the other great hoofed beasts of plain and jungle have changed. Then think of the tapir, older than them all, in its present shape, changeless. This great pig-like thing, with the trunk like a tail sprouting from a wrong angle of the body, is a living chapter of unthinkably ancient creation.

To see anything like it we must go to our natural-history museums and see the fossil records of former times. The flesh and blood that once animated those fossil bones in shape like that of the present-day tapir, perished from the earth long ago, but the tapir survives, isolated, primitive, lowly of brain.

THE STORY OF THE TAPIR WRITTEN IN THE ROCKS

In only two areas do we find tapirs to-day—the Malay region of Asia and the South and Central American area of the New World. America has several species of tapir, but these are not very distantly related to the Malayan representatives. That is a pretty puzzle in animal distribution, a maddening problem in the old days when men thought that species had always been where we find them to-day. Here are queer animals closely resembling one another—almost alike, in fact—found in parts of the world widely separated by great oceans.

Men who read the riddle of the rocks have explained the mystery. Tapirs were once a very widespread family. They teemed all over Europe and Asia. They are entombed in the rocks of England; they are incorporated in the stony surface of China. They lived and died in the United States. Present-day tapirs in tropical America and Malaya are survivals, the last links with an age which furnished luxuriant steaming forests to lands which now have temperate climates.

HOW THE SOUTHWARD MARCH OF ICE DROVE OUT THE TAPIR

A tapir from the upper and middle Tertiary rocks of Europe is practically identical in shape and structure with a tapir browsing in the secluded wilds of America or Asia to-day. That is how we know the amazing age of the animal.

We know what present-day conditions are favorable to tapirs. Therefore we are able to picture the conditions in which they lived throughout Europe when no North Sea came between England and the Continent. It is possible, even probable, that the wild men saw the last of the European tapirs; perhaps they shared with the southward march of the ice in exterminating them.

What was the color of these old animals we do not know, for only their bones remain; but there is a sharp distinction between the Asian and American species nowadays. The Malayan look like great brownish black animals over whose loins a white sheet has been thrown. The American have no white about them, except a rim of hairs fringing the edge of the ears. Yet in all the species the young are precisely alike, velvety brown coats being broken up with spots and stripes.

THE HABITS OF THE TAPIRS OF THE WORLD OF TO-DAY

In habits there is a general likeness. All are purely vegetable feeders. Some take juicy grass and marsh plants; some prefer the tender herbage of young trees. All take readily to the water, swim well, dive efficiently, and, like little hippopotamuses, which Linnæus thought them to be, walk sedately at the bottom of the river in which they are submerged.

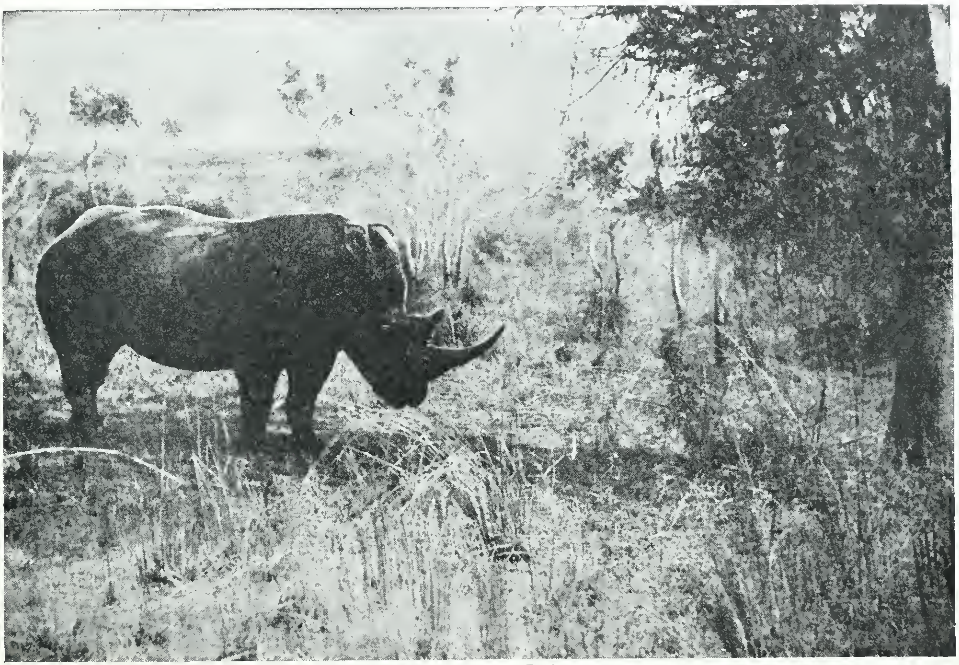
The exception is what is known as Roulin's tapir, a venturesome species which has gone to the hills for a living. This is found at heights ranging between 7,000 and 8,000 feet up the Cordilleras of Ecuador and Colombia. But we must not be astonished at that feat of mountaineering, for the great elephant goes higher than that in the Indian summer.

America has had and lost the mastodon, the mammoth, the elephant, the camel, the horse. The tapir saw them rise and develop; it saw them wane and pass. If we could put speech into its mouth this ancient creature could declare to us one of the great mysteries, the fate of the millions of horses which old America had and lost before white men came.

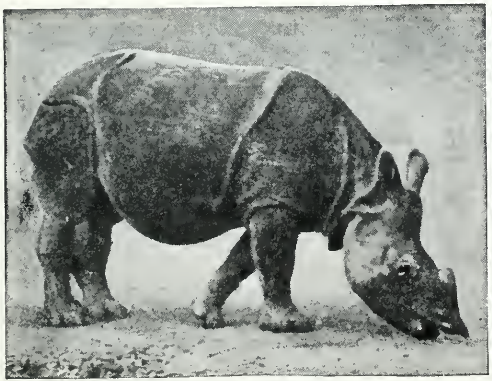
QUEER-LOOKING TENANTS OF THE JUNGLE

The grotesque Brazilian Tapir.

Malayan Tapir with his "white sheet."



The terrible African Rhinoceros.



A young Rhinoceros from India.

The Hairy-eared Rhinoceros from Sumatra.

The pictures on these pages are from photographs by Messrs. F. W. Bond, F. Russell Roberts and others.

THE AMAZING COURAGE OF THE TAPIR IN DEFENDING ITS YOUNG

But nothing matters to tapirs. They avoid attack; they elude pursuit. Never will a tapir show fight unless the one menaced be a mother and her little one in danger. Then she will make war with the courage of a lioness, charge, trample down, and worry an enemy with the zealous ardor of an enraged boar. In captivity tapirs are as meek as lambs and about half as intelligent.

Intelligence is, after all, not an abounding gift among the hoofed mammals. It is very high in the elephant and the horse; it is somewhat less in the mountain goat and some of the deer; it declines in the cattle; it is very low in the camel and the llama. And at about that level we find the rhinoceros.

If man-made mechanism had soul and brain we should find locomotives, steamships and motor cars among the aristocracy, and "tanks" would be the rhinoceroses of the order. A rhinoceros is like a tank of flesh and blood, mighty in strength for attack, mighty in strength to resist. Like the tank, it is hard to disable; like the tank, it charges over hedges and ditches.

During the World War bodies of British troops on the march in East Africa were sometimes charged by rhinos. So were men on patrol; and north and south of the Tsavo River the animals were so dangerous to troops that they had to be fought with firearms like human enemies. Many a march, many a camp, was disturbed by rhinoceros rage.

FURIOUS GIANTS OF THE JUNGLE THAT PUT ELEPHANTS TO FLIGHT

Now, a rhinoceros charge is probably as formidable an experience as human nerve can endure. When we look at the great boiler-like body of the rhino, set up on huge but stumpy legs, we do not realize the proportions of the beast any more than we grasp the immensity of a mountain at whose foot we stand. But a full-grown beast weighs from three to four tons, and its height is over six feet. What it can do in the everyday warfare to which it is exposed in the wilds, we do not know, for it is ticklish work to spy for long upon one of these furious giants; but one such battle between a rhino and a full-grown African elephant was seen. The elephant was put to flight as easily as a great sheep by a bulldog.

One incident illustrating rhinoceros manners and might is fixed in the mind. It is related by the man who slew the man-eating lions of Tsavo. He tells us that a gang of slaves was marching in Indian file, chained neck to neck, along an African trail, when a rhino suddenly charged out at right angles from the jungle. It rushed at the centre man and killed him with one thrust of its horn. The other twenty men fell dead, the neck of each one broken by the force of the blow. It is fair to say, however, that probably the rhinoceros does not always mean mischief when he charges. His eyesight is very poor, and sometimes he approaches from curiosity. When alarmed he keeps straight on because he does not know where else to go.

WAS THE WOOLLY RHINOCEROS THE DRAGON OF OUR STORIES?

Its bulk, its occasional ferocity, its gigantic strength, its grotesque figure, make the rhino a strange beast. Men live among rhinos to-day in Africa, in India and in Java; our ancestors lived with and fought these beasts in Europe and in America. In some sections the soil is thick with the bones of rhinos, not merely of the species now surviving, but rhinos which almost matched the elephant in size, and rhinos which had so thick a coat that it remains known as the Woolly rhinoceros.

Some students think that the legends of men fighting gigantic beasts and dragons come down to us from combats between men and rhinoceroses in places where the only remnants of rhinos to-day are fossils. Indeed at Klagenfurt, in Austria, a dragon-slaying tradition is preserved to this day. In a public square is a statue representing a hero slaughtering a dragon; in the town hall is the very head of the dragon which was slain.

Unfortunately for the legend a naturalist has examined that dragon's head. It is the skull of a woolly rhinoceros, and the dragon of the statue in the square has a head modeled from the remains in the hall. In other places, where traditional dragons are supposed to have flourished, rhinoceros bones have also been found.

THE TERRIBLE HORN AND TUSKS OF THE INDIAN RHINO

How did our forefathers fight the rhinoceros? The hide of this huge animal is the finest natural armor carried by a mammal on the land. It is of enormous thickness. It is laid on in huge folds, as we lay armor on a warship; it is studded with great horny bosses an inch in diameter. What spear could penetrate it, what arrow make the least impression? It is only in recent days with high-velocity bullets and heavy charges of powder that a man with a gun can be sure that his missile will not flatten and fall harmless from that coat of mail.

THE FIVE KNOWN SPECIES OF RHINOCEROSES

All of the continents except Australia have had rhinoceroses. Now the area is narrowed down to the limits already named. They are grouped into a number of species. The Indian rhino has but one horn. When at close quarters, the animal drives home the sharply pointed tusks of the lower jaw, causing terrible wounds. Left alone in jungle or grassy plain, the Indian rhino is peaceful and harmless. Other conditions bring other manners.

When the venturesome Portuguese began to find their way about in India in the great days of the early exploration, they somehow managed to secure an adult rhinoceros and carried it to their king. The visitor proved such an unqualified savage that the good king was afraid to keep it. So he sent it to the pope! Fortunately the monster was not permitted to exhibit its tantrums at the peaceful Vatican. It took a violent dislike to the little ship in which it was being carried, and butted so vigorously with its horned head that it sank the vessel and was seen no more.

The Javan rhinoceros is smaller than the Indian, has but one horn, and the folds of its skin are different. The Sumatran, the hairy baby of the tribe, at most 4½ feet high and weighing about a ton, has two horns. The front one is sometimes as much as twenty inches, but the rear one is very short.

There is another Asian variety called the Chittagong rhinoceros, but scientists now think that this is a local race of the Sumatran species.

THE SUPERSTITIONS OF OUR FOREFATHERS ABOUT THE RHINO

Throughout the East the belief is that the horn of the rhinoceros possesses magic medicinal properties. Doubtless a gentleman in China who sits down to a brew of rhino horn feels himself vastly comforted. Precisely the same belief obtained in former times in Europe. John Evelyn tells us in his Diary how he found a well kept pure by the presence in it of a rhinoceros horn. And old scholars of his time recorded that if a cup were made of rhino horn and poison were put into it, the vessel would reveal the drug by splitting in two.

Africa has two distinct species of these animals, the White rhinoceros and the Black. If we see one of each species before us we never can have any doubt as to which is which. For the darker, the almost black, will be the White rhinoceros, and the lighter colored will be the Black. Why such confusion?

It seems that the man who first bestowed the name of White rhinoceros saw one which had been taking a dust-bath of white, powdered earth and thought the color was permanent. By contrast, the undusted rhinoceros seemed a gentleman of sombre sable tint, so this one was called the Black rhinoceros.

THE DIFFERENCE BETWEEN THE BLACK RHINO AND THE WHITE

But there are some notable distinctions between the two. The White, which is the larger species, has a square upper lip suitable for feeding on grass. The Black has a pointed upper lip overhanging the lower, and with this it collects the branches of shrubs and low-hanging trees. Neither species has any front teeth, but both have formidable horns. The front horn of the Black rhino is sometimes about four feet long; while that of fine specimens of the White may be over five feet long.

The White, which is also called Burchell's rhinoceros, is now almost extinct. It has been hunted by white men ever since they first began to explore Africa, and, like so many of the larger animals, it will soon be only a memory. For an animal which seems so clumsy, it can move with considerable speed, almost as rapidly as a horse can run. Its sight is bad, but its sense of smell is keen. Hunters often cut off the hump and roast it in a hole in the ground. It tastes something like beef, but has a flavor all its own.

Although these horns are capable of dealing death at a blow, they are not horn in the sense that we understand the term with regard to cattle. In them the substance resembles that which composes hoofs and nails. In the rhinoceros the horn is a growth of tough, fibrous hair woven together in growth. It does not rise from the bone of the skull, but from the skin, and is mounted upon bony prominences lying beneath that skin, but not connected with the horn.

THE LITTLE SENTINELS THAT WARN THE RHINO WHEN DANGER COMES

Rhinoceroses keep within a few miles of watercourses, to which they go to drink every night and sometimes again in the early morning. They enjoy a mud-bath followed by a tumble in the dust, to coat themselves with a plaster to protect themselves against the bites of insects. For, in spite of their massive hides, they have their parasites. Those parasites have their enemies, which are birds that hover about the great animals and feed upon the insects infesting the giants' bodies. As a return for their keep these feathered gleaners act as sentinels. With loud cries and flapping wings, they stir the rhino to a sense of danger from man or other enemy.

As to other enemies, these must be few, but there are some. There is a record of a pack of hunger-maddened hyenas attacking, killing and devouring a full-grown rhinoceros. If anything could bite a way through that flesh-and-blood armor, surely it would be those appalling jaws which crack an ox's thigh-bone as we crack a filbert.

A BATTLE BETWEEN A CROCODILE AND A RHINO

But, as we see, he must drink, and in the water is a lurking death against which even his strength is not proof. Crocodiles are the foe. If the thing had not been actually seen and photographed, we should not believe that such a combat could take place, especially when we are told that the reptile won. But it is so. A crocodile-rhinoceros battle has been seen and photographed from beginning to end.

The giant beast went down to the Thika River near its junction with the Tana, in Kenya, East Africa. It stood to drink in a shallow place. A dark form shot through the deep middle course of the river, and in a moment a hind leg of the rhino was fast in a pair of jaws more terrible than any mantrap.

There was a frantic tug-of-war. The conditions were all in favor of the great reptile. On yielding soil the mammal could not get a fair purchase for a pull. Every time he sought to gather himself together for a fresh haul the constant tug of the crocodile got him a little farther and farther in. Suddenly he was off his feet and lurching back into the deeps.

THE COLOSSAL STRENGTH AND BLIND FURY OF THE RHINOCEROS

The river seemed to come to life. Crocodiles swarmed in the water, like a school of ferocious grampuses attacking a whale. There was a great struggle, and blood crimsoned the water. The land monster went down as helpless as a sheep before wolves. But the victory, the hauling of the giant from the side into the centre of the river, was the triumph of a single crocodile. Need we wonder that the boldest man is helpless in a similar crisis?

Stupidity, strength, occasional causeless, blind fury which impels it to attack the very bushes on which it feeds, dim sight, keen scent, power to live to a great age, willingness when young to attach itself with fretful affection to a human being, then to rend the same man when it grows up—these are the characteristics of the rhinoceros. He can trot as fast as we can run; he can raise a gallop which outstrips the fleetest man. He can eat a bale of hay and drink a cask of water at a meal, then gore the keeper who gave both.

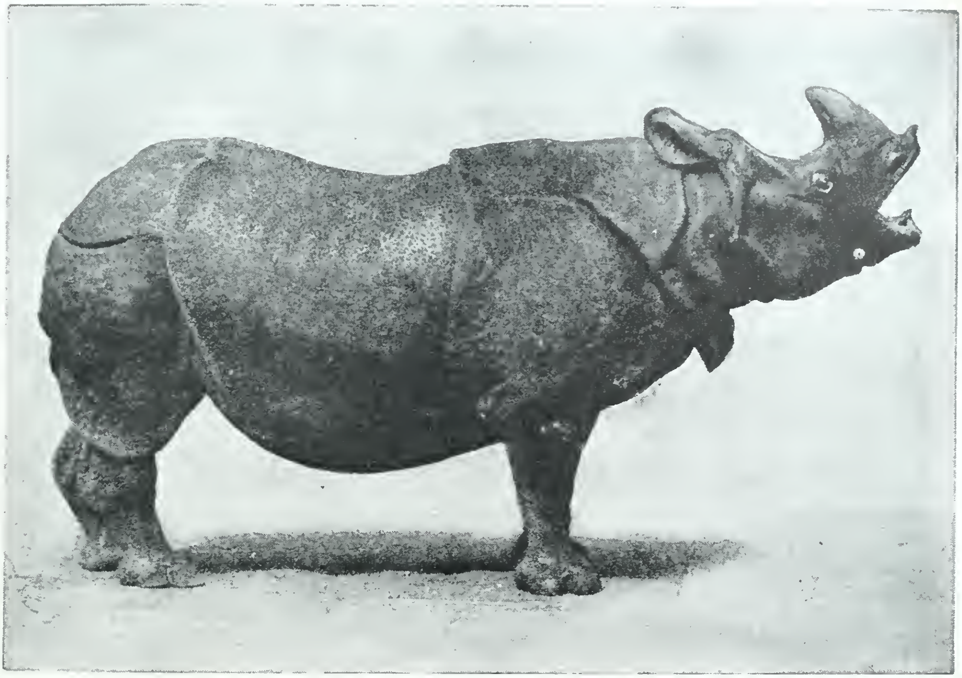
Nearly every zoo animal falls in love with the man who feeds and cleans and doctors him. The rhino never does. So the zoo builds him a den in which the bars are stout and strong and so placed that a man can slip between them instantly if threatened. The rhino cannot follow, by reason of his huge bulk, though he does his best. He is one of those animals in whom the loss of freedom seems, as age advances, to create an abiding madness, a simmering hatred of all human kind.

THE OLD CREATURES OF THE WORLD THAT HELP TO KEEP OUR WONDER ALIVE

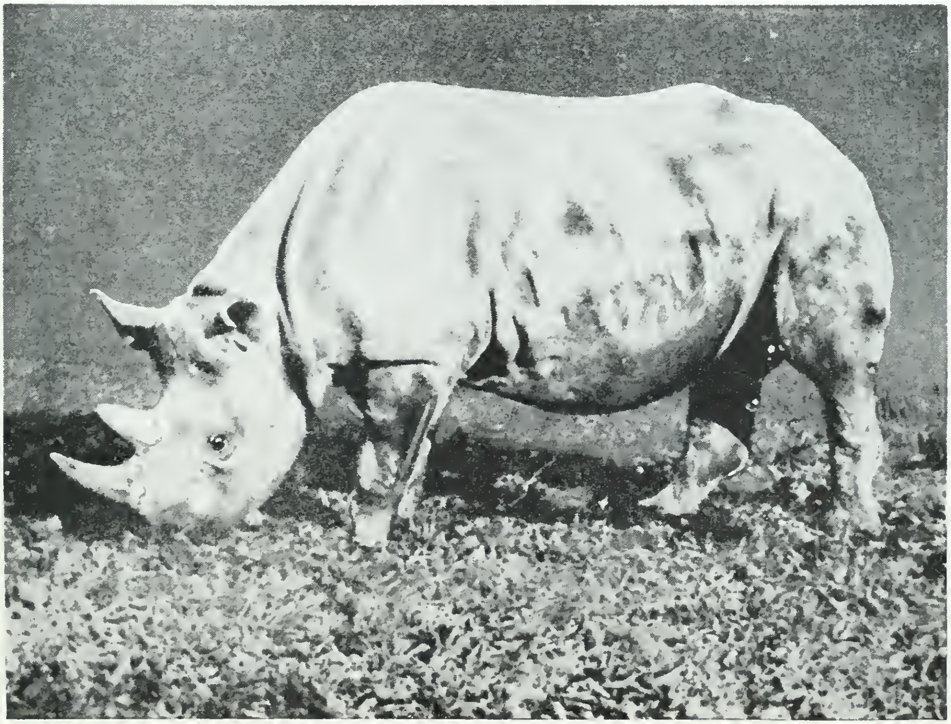
Possibly, were rhinoceroses small and our captors instead of being large and our prisoners, we should do to them what they attempt to do to us. Circumstances alter cases. The fact that this armored beast is, in spite of its drowsy ways, really a living volcano, adds to its fascination. We keep to the right side of the bars and frankly marvel. The rhinoceros and its kinsman the tapir help to keep alive our sense of wonder.

THE NEXT STORY OF ANIMAL LIFE IS ON PAGE 2011.

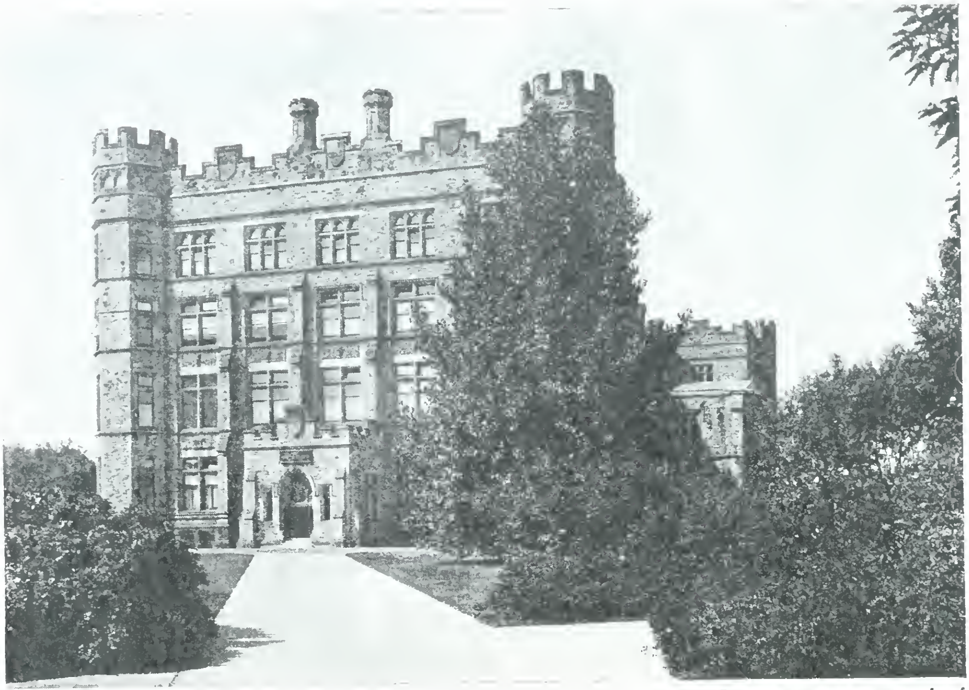
THE SAVAGE KING OF THE SWAMPS



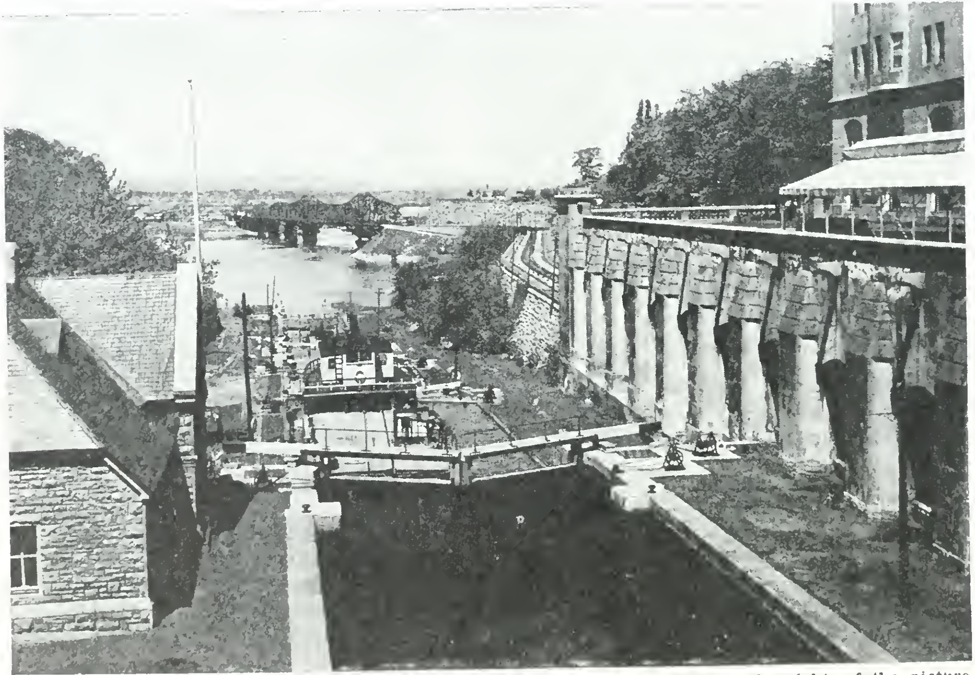
The one-horned Indian Rhinoceros with his thick armor of hide.



The two-horned Rhinoceros of New Guinea.



The National Gallery of Canada was founded in 1880 by the Marquis of Lorne, governor-general of Canada 1878–83. From this beginning the gallery has grown by means of annual grants from Parliament and by means of gifts. It is the repository also of the diploma works of the Royal Canadian Academy of Arts.



The locks on the Rideau River at Ottawa where the Rideau Canal begins. To the right of the picture stands the Château Laurier. Immediately above and to the left are the Parliament Buildings.

WHAT EVERY CANADIAN CHILD SHOULD KNOW

IN a free country every citizen must know something of his government, if his country is to continue free. The children of to-day are the citizens of to-morrow, and must prepare themselves for the duties and responsibilities of citizenship. Parents or teachers often speak of Parliaments, Ministers, Governors, Commissioners and the like, and much of their talk seems confusing. This story tells, in simple language, how the great Dominion as a whole and the different parts of it are governed. You will find that there is a great Parliament which sits at Ottawa, to make laws for the whole country, and that in each province there is another body which makes special laws for that division. If you read the whole article carefully, you will be able to understand what you hear or read in the newspapers about government. The foundation of the Canadian government is the rule of the people of Canada.

HOW CANADA IS GOVERNED

SOME of the rules by which the Dominion of Canada is governed are found in the British North America Act. This act was passed by the British Parliament in 1867, as a result of a request from the people who lived at that time in part of what we now call Canada. The difficulty that brought about the British North America Act was most real. Canada was growing, and still the population was small compared to the vast area of country that it spread itself over. The problem that faced the statesmen of that time was to have a central government in Ottawa which should, in reality, control the whole Dominion. But, at the same time, there had to be left for the separate provinces such control in matters of religion and education as would make the citizens of each province feel that they had a share in government and were not merely controlled by people in Ottawa whom they had never seen.

Remember, too, that this great experiment in governing was made at a time when a similar experiment had all but fallen to pieces. No form of government starts from nothing: it always has the example of some other government to look at, whether for instruction or warning. The United States, after they broke off from the Old Country, had the difficulty before them of combining a centralized government with large independence for the separate portions of it. And the Civil War, which had been fought immediately before Confederation in Canada, seemed to show to our statesmen that the central power in the United States had not had sufficient force to control the separate elements. For this reason the British North America Act states, with much clearness, the things which the provinces may do, and then leaves the residuary power to the Dominion Government at Ottawa. A man, when he makes his will, leaves certain bequests to individuals or to charities and then makes someone his "residuary legatee." The residuary legatee generally gets more than anyone else; and that is the intention of the testator. In the same way, the main power in Canada is in the Dominion Government. The Dominion of Canada did not come into being as the result of any revolution. The people of Canada are passionately loyal to Great Britain and are a part of the Empire. But they live thousands of miles from London and are facing difficulties of their own and meeting them in their own way. They are not trodden down by the legislature of the mother country. As a matter of form, when the Canadian people or their representatives wish a change to be made in the British North America Act, they must get the British Parliament to make the change for them. But as a matter of fact, no law would be forced upon them by Great Britain.

The King's title reads like this: "Of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, King, Defender of the Faith, Emperor of India." This means that King George is King of the Dominion of Canada as well as King of Great Britain and Ireland. But he does not live in Canada, you may say. He does not, nor has he been there since he ascended the throne. He sends a man, who is called the Governor-General, to Canada to take his place.

All this looks as though the King had a great deal of power in Canada. As a matter of fact, he has very little—not so much as he has in Great Britain, and that is not very much. The great power which English kings used to have now rests with a few members of the British Parliament. It is not really the King who sends a Governor-General to Canada, but the few members of the British Parliament who are called the Cabinet.

The same thing is true in Canada. The power is really in the hands of a few members of the Canadian Parliament. At the same time you must not think that the King and the Governor-General are mere figureheads. The people who really rule and are called the Cabinet would be very foolish not to take the King's or the Governor-General's advice when it is good advice. And as they are men of broad views and wide experience, their advice is often good.

So far as Great Britain and Canada are concerned, government is by consent and agreement. If any difficulty became really acute, and if Canadians were united in feeling that they had a grievance, the government in London would never attempt to press its own view. Whatever the situation may be in law, in practice it is fully recognized that the fine relationship between the parent land and the Dominion can be kept up only by consent and affection. It may be said, not only of Canada but of the other parts of the Empire, that the best way to keep the ties strong is to keep them loose. Canadians are loyal to the old flag, not because they are compelled to be loyal, but because they wish to be so.

THE CABINET, WHICH REALLY RULES CANADA

The men who govern Canada, with the consent of the Canadian Parliament, are members of what is called the Cabinet. All of them must belong to the King's Privy Council for Canada, but there are many men who are members of the Council and are not members of the Cabinet. When a man becomes a member of the Cabinet he is first made a Privy Councillor as a matter of form. The leading member of the Cabinet is called the Prime Minister. He is the man who has been chosen leader by the party having the majority in the House of Commons. He chooses the other members of the Cabinet, of whom there are usually about eighteen. All of them are members of Parliament.

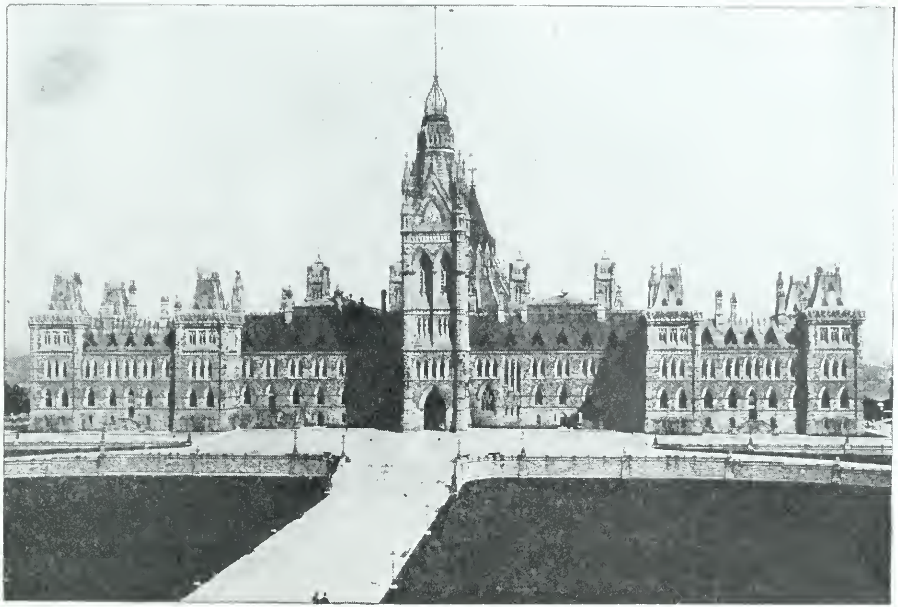
The members of the Cabinet must have a majority in the House of Commons who will vote with them. If this is not the case, the Cabinet must resign and allow those to take charge who have a majority. Or they may dissolve the House of Commons and order a general election, in the hope that they may obtain a majority from the new members. If they do not, they must then certainly resign, and the leader of the opposition becomes Prime Minister and selects the members of his Cabinet, who are also members of Parliament either before or after their selection.

PARLIAMENT: THE UPPER HOUSE, OR SENATE

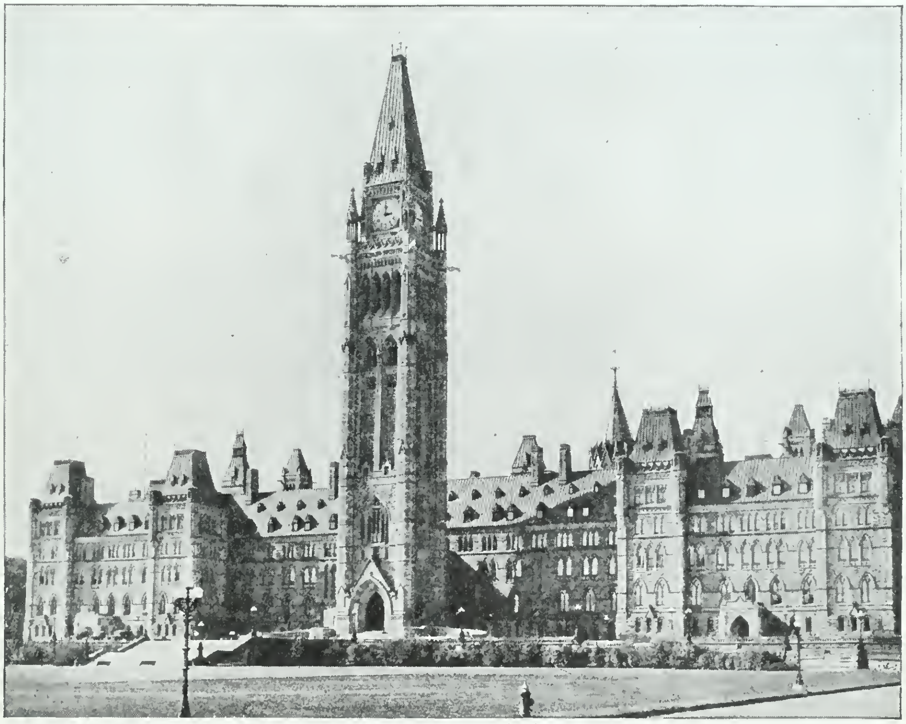
The Parliament of Canada is made up of two Houses, the Senate and the House of Commons. We shall tell you about the Senate first because it is supposed to rank first, and its members have the title of Honorable. As a matter of fact, the Senate has not nearly so much power as the House of Commons.

At present there are 96 senators, of whom 24 come from the Maritime Provinces, 24 from the province of Quebec, 24 from Ontario, and 6 from each of the western provinces. The senators are not elected by the people, but are appointed by the Governor-General, on the advice of the Cabinet, and hold office for life. This is one reason why the Canadian Senate has so little power. If its members were elected by the people, the electors would back it up. As matters now stand, the Senate represents no one in particular.

PARLIAMENT BUILDINGS OLD AND NEW



The Parliament Building at Ottawa was one of the most beautiful public buildings in America. It was burned in 1915, but rebuilding soon began. It stood on a bluff, overlooking the water, surrounded by beautiful lawns. Behind is the Library of Parliament.



The new Parliament Building follows the same general plans as the old, but closer examination will show the differences. Have you noticed that the new building has one more floor? The greater height of the central tower is plain at the first glance. The corner-stone of the tower was laid by the Prince of Wales. The architect was John Pearson.

Upper picture by Notman; lower, by Canadian National Railways.

There is still another reason why the Canadian Senate is weak, and that reason is that the Senate is not allowed to change any bill dealing with taxes or any money bill; and such bills cannot start in the Senate, but must come from the House of Commons. In all other respects the Senate may be said to resemble the House of Commons. It has often offended the House of Commons by changing bills or refusing to agree to them.

THE HOUSE OF COMMONS, WHICH IS THE IMPORTANT BODY

It is in the House of Commons that the real work of governing Canada is carried on. It is called the House of Commons after the mother House in Great Britain, and we like to think that it stands for the common people of Canada. Its members are elected by the people and may hold office for five years. As a matter of fact, there is usually an election every four years, and an election may be ordered by the Cabinet at any time. During the World War the Parliament was in office six years.

Nearly every person over twenty-one years of age in Canada who is a British subject has a right to vote in an election. The government of each province decides who may vote in that province. Anyone who has even a very small income or owns only a little property has the right, and in some provinces everyone who is a British subject may vote. Since 1918 women have had the same rights of voting as men; but in some of the provinces, as British Columbia and Manitoba, they had full voting rights long before, and in others they had partial suffrage.

The number of members in the House is decided in rather an odd manner. The province of Quebec always has 65, and the number in the other provinces is fixed by their populations as compared with the population of Quebec. For instance, a province which has only one-quarter or one-half as many people as Quebec may elect only one-quarter or one-half as many members. At present the House has 245 members, and the number is changed after each census in the manner pointed out. Ontario now has 82; Nova Scotia, 14; New Brunswick, 11; Prince Edward Island, 4; Manitoba, 17; Saskatchewan, 21; Alberta, 16; British Columbia, 14; and the Yukon has a single member.

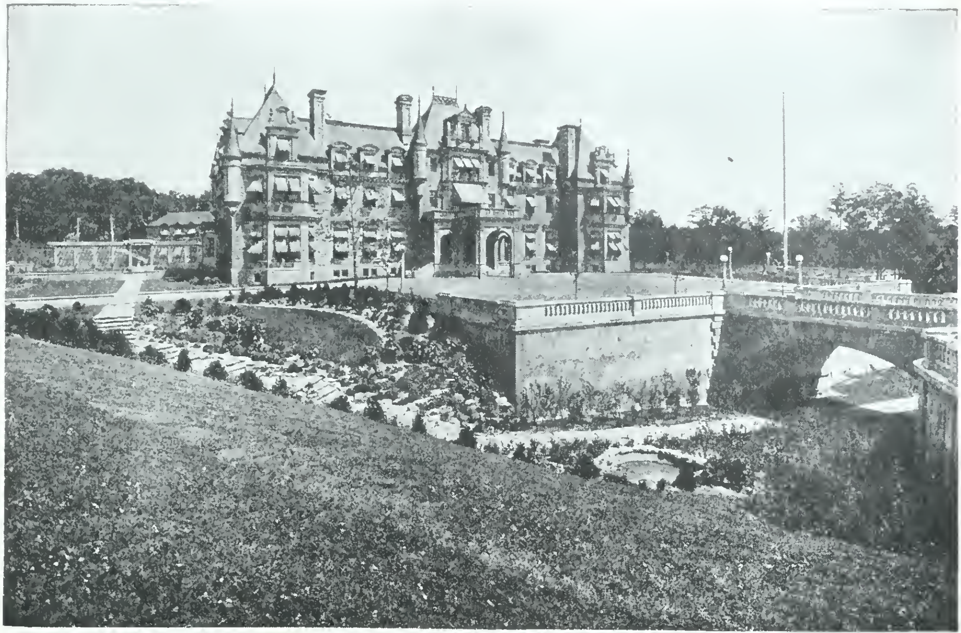
Photo, Pringle & Booth.

THE PARLIAMENT BUILDING OF ONTARIO AT TORONTO

CANADA IS A FEDERAL DOMINION

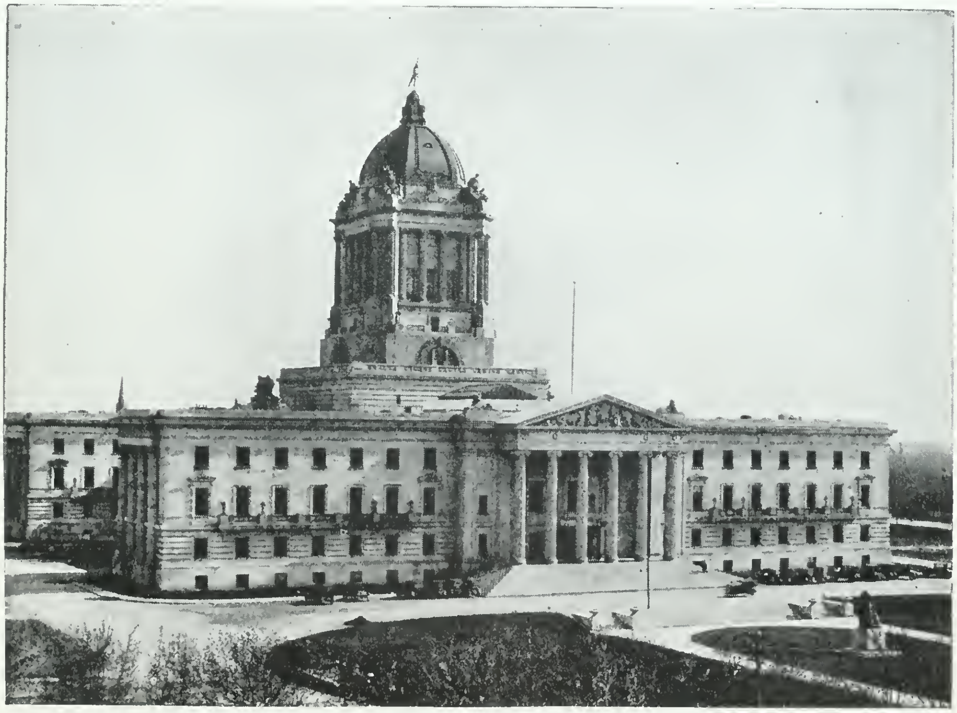
Canada has a government for the Dominion as a whole and also a government for each of its nine provinces, as well as a form of government for the Yukon Territory and for the Northwest Territories. The Dominion Parliament has control over those things which are of importance to the whole of Canada, while the provincial governments deal with matters which are peculiar to the provinces. In order that there may be as little confusion as possible, certain things are left to the provincial governments and all the rest go to the Dominion Parliament. This divi-

NOTABLE GOVERNMENT BUILDINGS



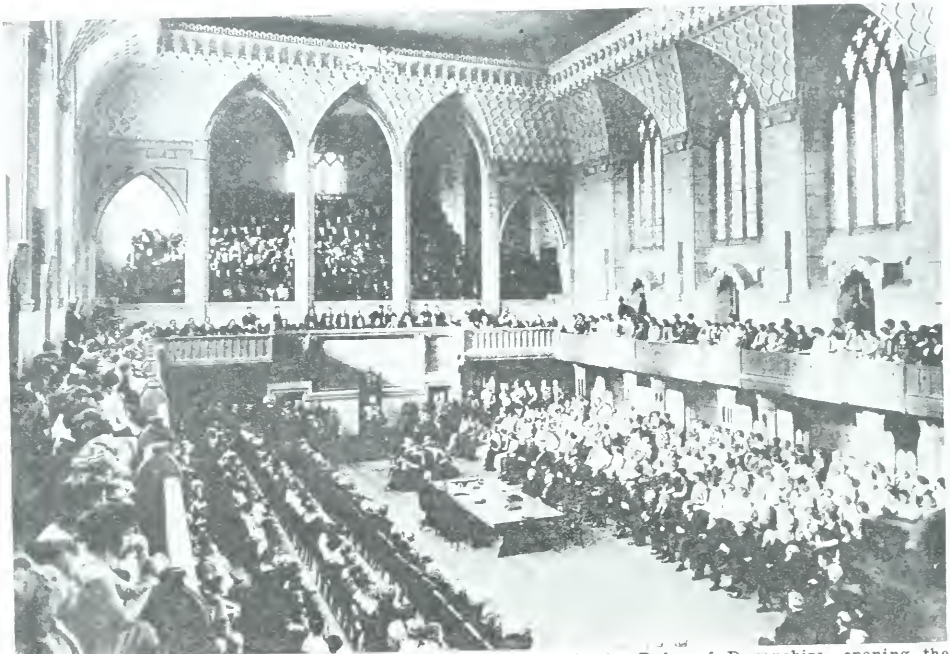
Photo, Pringle & Booth.

The new Government House at Toronto is charmingly situated in the residential district of Rosedale. In each province the King is represented by a Lieutenant-Governor, appointed by the Governor-General in Council, and governing with the advice and assistance of his Ministry. This is responsible to the Legislature and resigns office when it ceases to enjoy the confidence of that body.

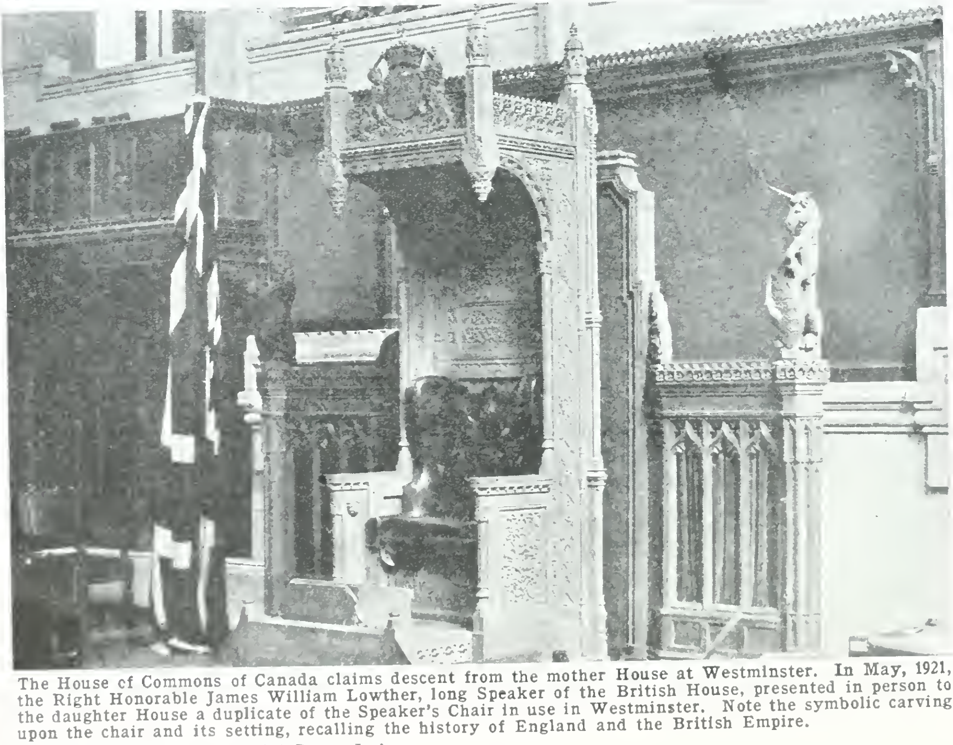


The Provincial Legislative Building of the province of Manitoba is constructed of native dressed stone. It is a particularly handsome structure, and its lofty dome greets the eye from almost every part of the city.

SOME LINKS WITH THE DAYS OF OLD



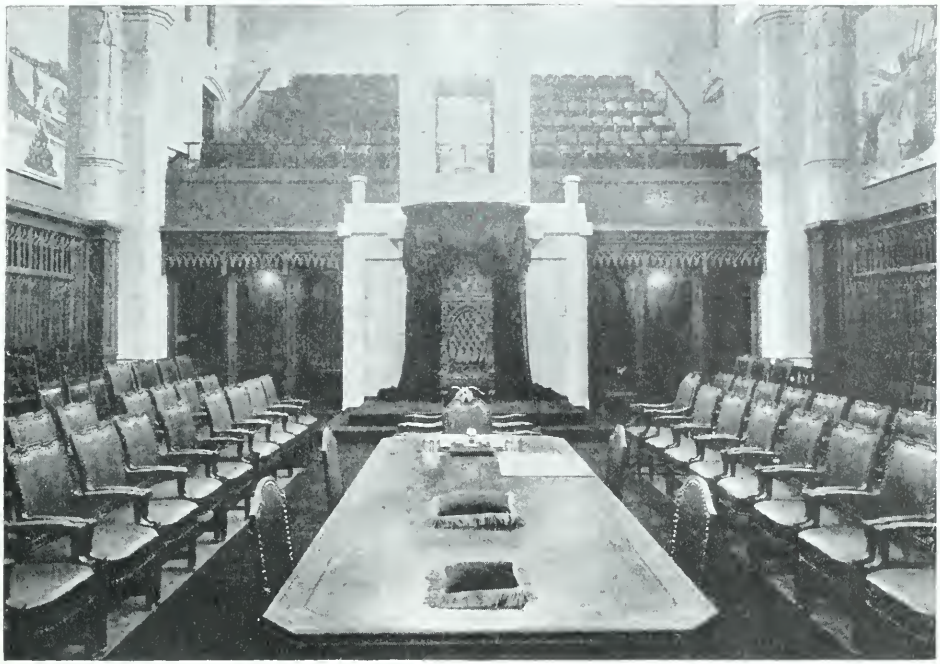
With much ceremony we see here the late Governor-General, the Duke of Devonshire, opening the Dominion Parliament for the first time in the new building. To his right are the members of the Cabinet. Seated in front of him are the members of the Supreme Court in their robes of office. The members of the Senate and House of Commons, with their wives, occupy the remaining seats upon the floor.



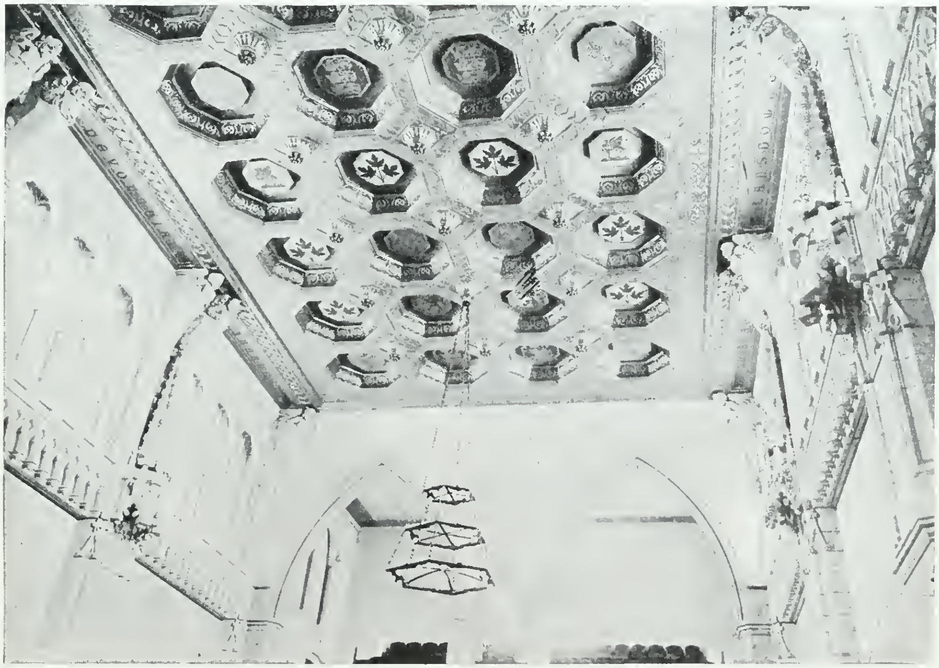
The House of Commons of Canada claims descent from the mother House at Westminster. In May, 1921, the Right Honorable James William Lowther, long Speaker of the British House, presented in person to the daughter House a duplicate of the Speaker's Chair in use in Westminster. Note the symbolic carving upon the chair and its setting, recalling the history of England and the British Empire.

Pictures, British and Colonial Press, Ltd.

IN THE SENATE CHAMBER



The Senate Chamber of the Parliament of Canada is not so large as that of the House of Commons, but it is a dignified and impressive hall, nevertheless. The Speaker's Chair is in the centre and above is a gallery for spectators. The building is constructed almost entirely of Canadian materials, and the walls are decorated with historical paintings.



In the ceiling of the chamber are repeated over and over the symbols of the five great divisions from which the Canadians trace their descent. They are England, France, Scotland, Ireland and Wales. You can pick them out if you will study the picture carefully, though the French lilies do not show very clearly. The whole building is well worth careful study. Pictures, British and Colonial Press, Ltd.

sion is made in the British North America Act.

If a provincial government passes any act which it has no right to pass, the Dominion Cabinet generally leaves it to the courts to say that the act shall not be obeyed. But when a provincial government passes an act which may be for the benefit of the province but is not in the best interests of Canada, or the Empire, the Dominion Cabinet does not hesitate to set it aside.

THE PROVINCIAL GOVERNMENTS: THE LIEUTENANT-GOVERNOR

At the head of each provincial government is a Lieutenant-Governor, who is appointed by the Dominion Cabinet for five years. Like the Governor-General or the King, he has very little real power.

The real power in each province is in the hands of the Cabinet, or Executive Council, as it is usually called. All that has been said about the Dominion Cabinet holds true of each Executive Council, whose members are selected by the leader of the provincial government. This leader, who is called the Premier, is chosen by the party which has a majority in the Legislative Assembly. If no party has a majority, the leaders must be accepted by two or more groups of members, who together make up a majority.

Two of the provinces, Quebec and Nova Scotia, have Legislative Councils. In these provinces the Legislative Councillors are appointed for life by the Executive Council. The Legislative Council is very much like the Dominion Senate, both in the manner of appointment and in the little power or influence which it has.

In all the provinces but Quebec and Nova Scotia the Legislative Assembly is the only body that passes laws, and in the two provinces where there is another house, the Assembly is the real governing body. Its members are chosen by the people for a period which is not quite the same in all the provinces, but is generally four or five years.

The Yukon Territory is directly east of Alaska and is in the extreme northwest of Canada. When gold was found in the Klondike, which is in the Yukon Territory, many people went there in search of wealth. These people, together with the few who had been there before, were given a very limited power to make laws for themselves. There is a Territorial Council of three members chosen by the people which exercises limited powers. Other important officials are appointed by the Dominion authorities. Excellent order is kept by the Royal Canadian Mounted Police. The Yukon has one member in the House of Commons.

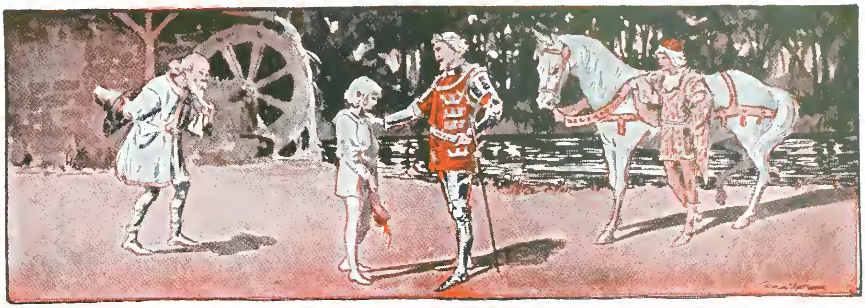
That part of Canada which is not included in the nine provinces or the Yukon is called the Northwest Territories. Like the Yukon, they are governed by a Commissioner who is appointed by the Dominion Cabinet, and takes his orders from the Dominion Cabinet. The country is sparsely inhabited, and the people are widely scattered, and the administration of the law is therefore left to the Police.

POLITICS AND POLITICAL PARTIES IN CANADA

Before the World War most Canadians, like most Englishmen, were born either little Liberals or little Conservatives. During the war a Coalition, or Unionist, government was formed, and party lines were less strict. Since the war the people in some of the provinces have shown a tendency to organize political groups according to occupations. In some provinces the United Farmers are strong, and Labor and other parties have also been organized. Whether the two old parties will regain their former strength, or whether there are to be many parties in the future, only time can tell. In the meantime the efforts to form a third party have received a setback. There seems to be something almost inevitable in the two-party system.

Indeed time is the only judge that can surely decide upon the real value of our plans and regulations. For the present is steadily rolling on into the future; and, as the years pass, old conditions drop away to be lost sight of, while new requirements come into view. Then arises the true test. The law of to-day may not fit the man of to-morrow. The parties of to-day may be supplanted by other parties whose policies better meet a later day. Whenever a plan holds good under the inevitable changes of years it is proof that the makers were men of wisdom and foresight, building for the days to come as well as for their own day. With the expansion of our country its problems have multiplied and grown more varied, making necessary some additions and adjustments of detail; but the great body of the government plan is fully equal to the greater demands.

THE NEXT STORY OF CANADA IS ON PAGE 1955.



THE GIANT WITH THREE GOLDEN HAIRS

CONTINUED FROM 1693

THERE was once a poor man who had an only son born to him. The child was supposed to be born under a lucky star; and those who told his fortune said that in his fourteenth year he would marry the King's daughter. It so happened that the King of that land, soon after the child's birth, passed through the village in disguise, and asked whether there was any news.

"Yes," said the people; "a child has just been born, who, they say, is to be a lucky one; and when he is fourteen years old he is to marry the King's daughter."

This did not please the King, so he went to the poor child's parents and asked them whether they would sell him their son.

They refused.

But the stranger begged very hard and offered a great deal of money; and as they had scarcely bread to eat, at last they consented, thinking to themselves: He is a lucky child; he can come to no harm.

The King took the child, put it into a box, and rode away; but when he came to a deep stream he threw it into the water.

The box, however, floated down the stream; some kind fairy watched over it so that no water reached the child, and at last, about two miles from the King's capital, it stopped beside a mill. The miller soon saw it, and took a long pole and drew it toward the shore, and inside he found the pretty little boy, who looked up at him with a merry smile. Now, the miller and his wife had no children, and so they were glad to see the baby, and saying, "Heaven has sent it to us," they treated it very kindly, and brought it up with such care that everyone loved it.

About thirteen years had passed over their heads when the King came by accident to the mill and asked the miller if that were his son.

"No," said the miller; "I found him when a babe, in a box in the stream, some thirteen years ago."

"He is a fine fellow," said the King. "Can you spare him to carry a letter to the Queen?"

"As your Majesty pleases," answered the miller.

Now, the King had soon guessed that this was the child whom he had tried to drown; and he sent a letter by him to the Queen, saying: "As soon as the bearer of this arrives, let him be killed and immediately buried, so that all may be over before I return."

The young man set out with this letter, but missed his way, and came in the evening to a little cottage. There was no one within except an old woman, who said: "Why do you come here? And where are you going?"

"I am going to the Queen, to whom I was to have taken a letter; but I have lost my way, and shall be glad if you will give me a night's shelter."

"You are very unlucky," she said, "for this is a robber's hut; and if the band returns while you are here it may be worse for you."

But he was so tired that he laid the letter on the table, stretched himself out upon a bench, and fell asleep.

When the robbers came home and saw him, they asked the old woman who the strange lad was.

"I have given him shelter for charity," she said. "He had a letter to carry to the Queen, and lost his way."

The robbers took up the letter, broke it open, and read the directions to murder the bearer which it contained. Then their leader tore it, and wrote a fresh one desiring the Queen, as soon as the young man arrived, to marry him to the King's daughter. Meantime they let him sleep on till morning broke, and then showed him the right way to the Queen's palace, where, as soon as she had read the letter, she had preparations made for the wedding.

After a while the King returned; and when he saw the prediction fulfilled, and that this child of fortune was married to his daughter, he was very angry, and said: "No man shall have my daughter who does not descend into the wonderful cave and bring me three golden hairs from the head of the Giant King who reigns there."

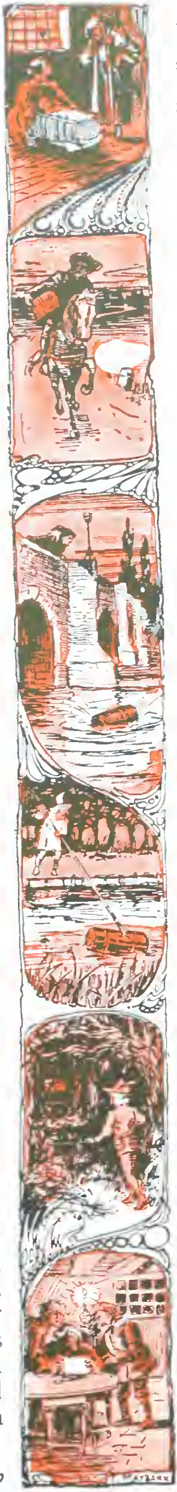
"I will soon manage that," said the youth. And he took leave of his wife and set out on his journey.

At the first city that he came to, the guard of the gate stopped him and asked what trade he followed, and what he knew.

"I know everything," said he.

"If that be so," replied they, "you are just the man we want. Be so good as to tell us why our fountain in the market place is dry and will give no water. Find out the cause of that, and we will give you two asses loaded with gold."

"With all my heart," said he, "when I come back."



Then he journeyed on and came to another city, and there the guard also asked him what trade he followed, and what he understood.

"I know everything," he answered.

"Then pray do us a piece of service," said they. "Tell us why a tree which used to bear us golden apples now does not even produce a leaf."

"Most willingly," answered he, "as I come back."

At last his way led him to the side of a great lake of water, over which he must pass. The ferryman soon began to ask, as the others had done, what was his trade, and what he knew.

"Everything," said he.

"Then," said the other, "pray inform me why I am bound forever to ferry over this water, and have never been able to get my liberty. I will reward you handsomely."

"I will tell you all about it," said the young man, "as I come home."

When he had passed the water, he came to the wonderful cave. But the Giant King was not at home, and his grandmother sat at the door in her easy-chair.

"What do you seek?" she said.

"Three golden hairs from the giant's head," answered he.

The woman considered a while. The loss of three of his abundant gold hairs could do her grandson no harm, and this handsome young man had somehow found his way straight to her heart. She had yearned for such a son herself.

"You run a great risk," said she; "yet, when he returns home, I will try what I can do for you."

Then she changed him into an ant, and told him to hide in her cloak.

"Very well," said he; "but I want also to know why the city fountain is dry, and why the tree that bore golden apples is now leafless, and what it is that binds the ferryman to his post."

"Those are three puzzling questions," said the old woman, "but lie quiet, and listen to what the giant says when I pull the golden hairs."

Presently night set in, and the Giant King returned home. As soon as he entered he began to snuff up the air, and cried: "All is not right here: I smell man's flesh."

Then he searched all round in vain, and the old dame scolded, and said: "Why should you turn everything topsy-turvy? I have just set all in order."

Upon this he laid his head in her lap and soon fell asleep. As soon as he began to snore, she seized one of the golden hairs and pulled it out.

"Mercy!" cried he, starting up. "What are you about?"

"I had a dream that disturbed me," said she, "and in my trouble I seized your hair. I dreamed that the fountain in the market place of the city had become dry and would give no water. What can be the cause?"

"Ah, if they could find that out, they would be glad," said the giant. "Under a stone in the fountain sits a toad; when they kill him it will flow again."

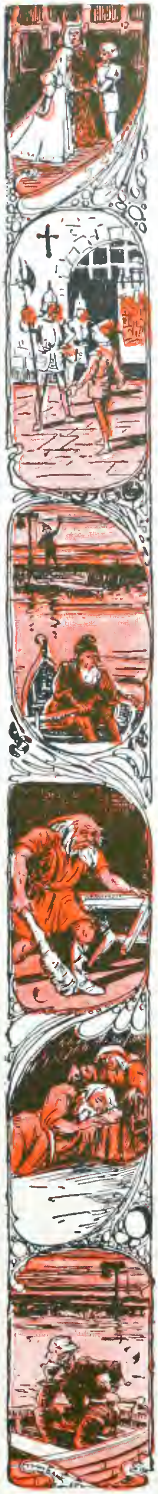
This said, he fell asleep, and the witch pulled out another hair.

"What would you be at?" cried he, in a rage.

"Don't be angry," said she, "I did it in my sleep. I dreamed that in a great kingdom there was a beautiful tree that used to bear golden apples, and now it has not even a leaf upon it. What is the reason of that?"

"Aha!" said the giant, "they would like very well to know that secret. At the root of the tree a mouse is gnawing: if they were to kill him, the tree would bear golden apples again."

Then once more he fell asleep; and when she heard him snore she pulled out the third golden hair, and the giant jumped up and threatened her, but she soothed him, and said: "It was a strange dream. I thought I saw a ferryman who was fated to row backward and forward over a lake, and could never be set at liberty. What is the charm that binds him?"



"A silly fellow!" said the giant. "If he were to give the rudder into the hand of any passenger, he would find himself at liberty, and the other would be obliged to take his place."

In the morning the giant arose and went out; and the old woman gave the young man the three golden hairs, reminded him of the answers to his questions, and sent him on his way.

He soon came to the ferryman, who knew him again, and asked for the answer which he had promised him.

"Ferry me over first," said he, "and then I will tell you."

When the boat arrived on the other side, he told him to give the rudder to any of his passengers, and then he might run away as soon as he pleased.

The next place he came to was the city where the barren tree stood.

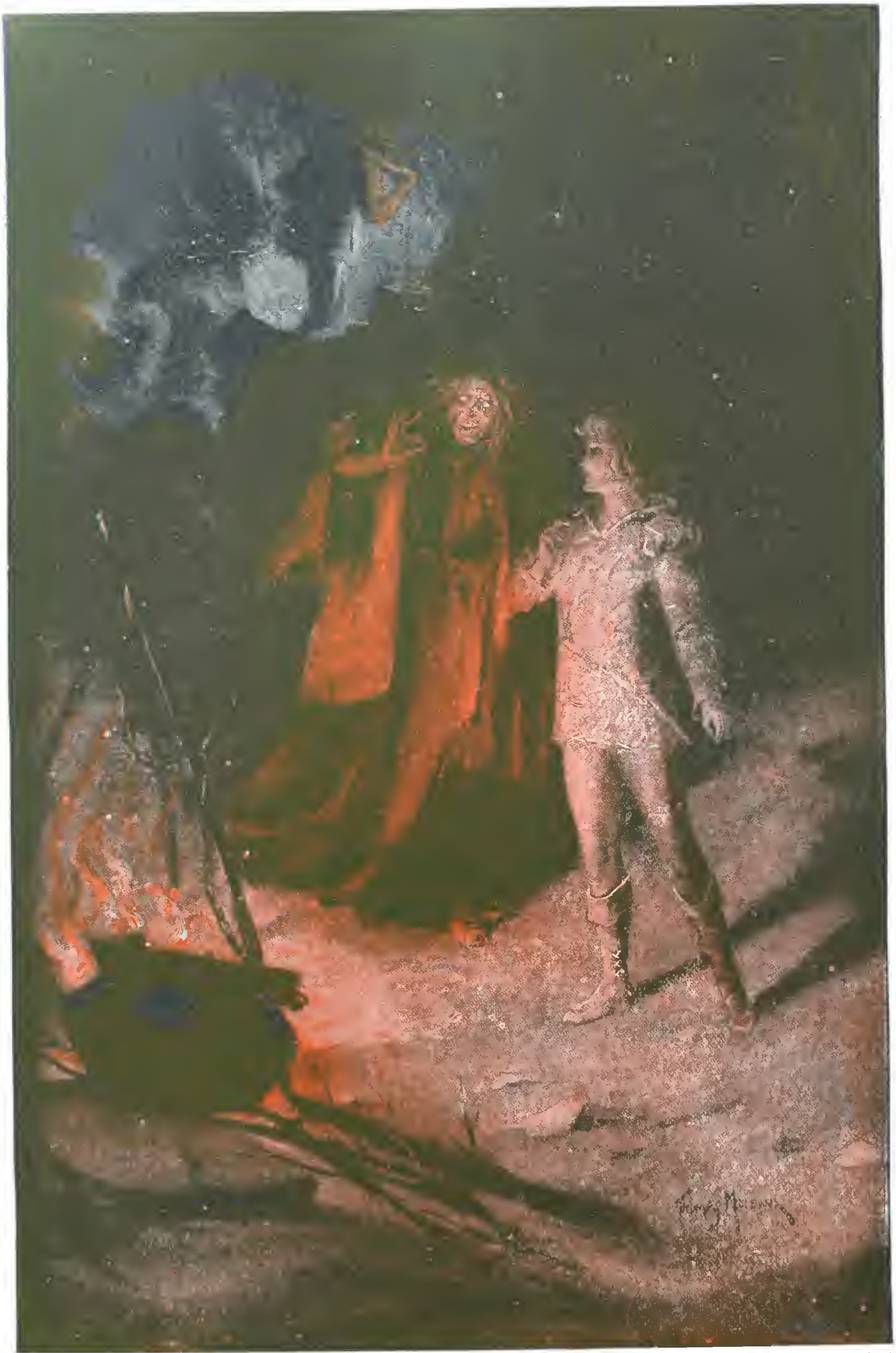
"Kill the mouse," said he, "that gnaws at the root, and you will have golden apples again."

They gave him a rich present, and he journeyed on to the city where the fountain had dried up, and the guard demanded his answer to their question. So he told them how to cure the mischief, and they thanked him and gave him the two asses laden with gold.

And now at last this lucky young man reached home, and his wife rejoiced greatly to see him, and to hear how well everything had gone with him. He gave the three golden hairs to the King, who could no longer raise any objection to him, and he and his beautiful wife lived happily together, and in due time became king and queen.

The old King was well punished, for he was the very next person the ferryman saw. The ferryman gave the rudder into his hand, and to this day the old King sits ferrying passengers across the lake.

THE WITCH AND THE MILLER'S SON



After many adventures the miller's son arrived at the famous cave. While the giant slept the old witch plucked the three golden hairs from his head. In the morning the giant arose and went out. Then the witch gave the young man the precious hairs which were to win for him the hand of the beautiful princess.

EAST OF THE SUN AND WEST OF THE MOON

By Kay Neilsen

ONCE on a time there was a poor husbandman who had so many children that he hadn't much of either food or clothing to give them. Pretty children they all were, but the prettiest was the youngest daughter, who was so lovely there was no end to her loveliness.

So one day, 'twas on a Thursday evening late at the fall of the year, the weather was so wild and rough outside, and it was so cruelly dark, and rain fell and wind blew, till the walls of the cottage shook again. There they all sat round the fire, busy with this thing and that. But just then, all at once something gave three taps on the windowpane. The father went out to see what was the matter; and, when he got out of doors, what should he see but a great big White Bear.

"Good-evening to you!" said the White Bear.

"The same to you!" said the man.

"Will you give me your youngest daughter? If you will, I'll make you as rich as you are now poor," said the Bear.

Well, the man would not be at all sorry to be so rich; but still he thought he must have a bit of a talk with his daughter first; so he went in and told them how there was a great White Bear waiting outside, who had given his word to make them so rich if he could only have the youngest daughter.

The lassie said "No!" outright. Nothing could get her to say anything else; so the man went out and settled it with the White Bear that he should come again next Thursday evening and get an answer. Meantime he talked his daughter over, and kept on telling her of all the riches they would get, and how well off she would be herself; and so at last she thought better of it, and washed and mended her rags, made herself as smart as she could, and was ready to start. I can't say her packing gave her much trouble.

Next Thursday evening came the White Bear to fetch her, and she got upon his back with her bundle, and off they went. So, when they had gone a bit of the way, the White Bear said: "Are you afraid?"

"No," she wasn't.

"Well! mind and hold tight by my shaggy coat, and then there's nothing to fear," said the Bear.

So she rode a long, long way, till they came to a great steep hill. There, on the face of it, the White Bear gave a knock, and a door opened, and they came into a castle where there were many rooms all lit up; rooms gleaming with silver and gold; and there, too, was a table ready laid, and it was all as grand as grand could be. Then the White Bear gave her a silver bell; and when she wanted anything, she was only to ring it, and she would get it at once.

Well, after she had eaten and drunk, and evening wore on, she got sleepy after her journey, and thought she would like to go to bed, so she rang the bell; and she had scarce taken hold of it before she came into a chamber where there was a bed made, as fair and white as anyone would wish to sleep in, with silken pillows and curtains and gold fringe. All that was in the room was gold or silver; but when she had gone to bed and put out the light, a man came and laid himself alongside her. That was the White Bear, who threw off his beast shape at night; but she never saw him, for he always came after she had put out the light, and before the day dawned he was up and off again. So things went on happily for a while, but at last she began to get silent and sorrowful; for there she went about all day alone, and she longed to go home to see her father and mother and brothers and sisters. So one day, when the White Bear asked what it was that she lacked, she said it was so dull and lonely there, and how she longed to go home to see her father and mother and brothers and sisters, and that was why she was so sad and sorrowful, because she couldn't get to them.

"Well, well!" said the Bear, "perhaps there's a cure for all this; but you must promise me one thing, not to talk alone with your mother, but only when the rest are by to hear; for she'll take you by the hand and try to lead you into a room to talk; but you must mind and

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not do that, else you'll bring bad luck on both of us."

So one Sunday the White Bear came and said, now they could set off to see her father and mother. Well, off they started, she sitting on his back; and they went far and long. At last they came to a grand house, and there her brothers and sisters were running about out of doors at play, and everything was so pretty, 'twas a joy to see.

"This is where your father and mother live now," said the White Bear; "but don't forget what I told you, else you'll make us both unlucky."

"No! bless her, she'd not forget!"—and when she had reached the house, the White Bear turned right about and left her.

Then, when she went in to see her father and mother, there was such joy, there was no end to it. None of them thought they could thank her enough for all she had done for them. Now, they had everything they wished, as good as good could be, and they all wanted to know how she got on where she lived.

Well, she said, it was very good to live where she did; she had all she wished. What she said beside I don't know, but I don't think any of them had the right end of the stick, or that they got much out of her. But so, in the afternoon, after they had done dinner, all happened as the White Bear had said. Her mother wanted to talk with her alone in her bedroom; but she minded what the White Bear had said, and wouldn't go upstairs.

"Oh! what we have to talk about will keep!" she said, and put her mother off. But, somehow or other, her mother got round her at last, and she had to tell her the whole story. So she said, how every night when she had gone to bed a man came and lay beside her as soon as she had put out the light; and how she never saw him, because he was always up and away before the morning dawned; and how she went about woeful and sorrowing, for she thought she should so like to see him; and how all day long she walked about there alone; and how dull and dreary and lonesome it was.

"My!" said her mother; "it may well be a Troll you slept with! But now I'll teach you a lesson how to set eyes on him. I'll give you a bit of candle, which you can carry home in your bosom; just light that while he is asleep, but take care not to drop the tallow on him."

Yes! she took the candle and hid it in her bosom, and as night drew on, the White Bear came and fetched her away.

But when they had gone a bit of the way, the White Bear asked if all hadn't happened as he said.

"Well, she couldn't say it hadn't."

"Now, mind," said he, "if you have listened to your mother's advice, you have brought bad luck on us both, and then, all that has passed between us will be as nothing."

"No," she said, "she hadn't listened to her mother's advice."

So when she reached home, and had gone to bed, it was the old story over again. There came a man and lay down beside her; but at dead of night, when she heard he slept, she got up and struck a light, lit the candle, and let the light shine on him, and so she saw that he was the loveliest Prince one ever set eyes on, and she fell so deep in love with him on the spot, that she thought she couldn't live if she didn't give him a kiss there and then. And so she did; but as she kissed him, she dropped three hot drops of tallow on his shirt, and he woke up.

"What have you done?" he cried; "now you have made us both unlucky, for had you held out only this one year, I had been freed. For I have a stepmother who has bewitched me, so that I am a White Bear by day, and a Man by night. But now all ties are snapt between us; now I must set off from you to her. She lives in a castle which stands East of the Sun and West of the Moon, and there, too, is a Princess, with a nose three ells long, and she's the wife I must have now."

She wept and took it ill, but there was no help for it; go he must.

Then she asked if she mightn't go with him.

No, she mightn't.

"Tell me the way, then," she said, "and I'll search you out; *that* surely I may get leave to do."

"Yes," she might do that, he said; "but there was no way to that place. It lay East of the Sun and West of the Moon, and thither she'd never find her way."

So next morning, when she woke up, both Prince and castle were gone, and there she lay on a little green patch, in the midst of the gloomy thick wood, and by her side lay the same bundle of rags she had brought with her from her old home.

So when she had rubbed the sleep out of her eyes, and wept till she was tired, she set out on her way, and walked many, many days, till she came to a lofty crag. Under it sat an old hag, and played with a gold apple which she tossed about. Her the lassie asked if she knew the way to the Prince, who lived with his step-mother in the castle, that lay East of the Sun and West of the Moon, and who was to marry the Princess with a nose three ells long.

"How did you come to know about him?" asked the old hag; "but maybe you are the lassie who ought to have had him?"

Yes, she was.

"So, so; it's you, is it?" said the old hag. "Well, all I know about him is, that he lives in the castle that lies East of the Sun and West of the Moon, and thither you'll come, late or never; but still you may have the loan of my horse, and on him you can ride to my next neighbor. Maybe she'll be able to tell you; and when you get there, just give the horse a switch under the left ear, and beg him to be off home; and, stay, this gold apple you may take with you."

So she got upon the horse, and rode a long, long time, till she came to another crag, under which sat another old hag, with a gold carding-comb. Her the lassie asked if she knew the way to the castle that lay East of the Sun and West of the Moon, and she answered, like the first old hag, that she knew nothing about it, except it was East of the Sun and West of the Moon.

"And thither you'll come, late or never, but you shall have the loan of my horse to my next neighbor; maybe she'll tell you all about it; and when you get there, just switch the horse under the left ear, and beg him to be off home."

And this old hag gave her the golden carding-comb; it might be she'd find some use for it, she said. So the lassie got upon the horse, and rode a far, far way, and a weary time; and so at last she came to another great crag, under which sat another old hag, spinning with a golden spinning-wheel. Her, too, she asked if she knew the way to the Prince, and where the castle was that lay East of the Sun and West of the Moon. So it was the same thing over again.

"Maybe it's you who ought to have had the Prince?" said the old hag.

Yes, it was.

But she, too, didn't know the way a bit better than the other two. "East of the Sun and West of the Moon it was," she knew—that was all.

"And thither you'll come, late or never; but I'll lend you my horse, and then I think you'd best ride to the East Wind and ask him; maybe he knows those parts, and can blow you thither. But when you get to him, you need only give the horse a switch under the left ear, and he'll trot home of himself."

And so, too, she gave her the gold spinning-wheel. "Maybe you'll find a use for it," said the old hag.

Then on she rode many days, a weary time, before she got to the East Wind's house, but at last she did reach it, and then she asked the East Wind if he would tell her the way to the Prince who dwelt East of the Sun and West of the Moon. Yes, the East Wind had often heard tell of it, the Prince and the castle, but he couldn't tell the way, for he had never blown so far.

"But, if you will, I'll go with you to my brother the West Wind, maybe he knows, for he's much stronger. So if you will just get on my back, I'll carry you thither."

Yes, she got on his back, and I should just think they went briskly along.

So when they got there, they went into the West Wind's house, and the East Wind said the lassie he had brought was the one who ought to have had the Prince who lived in the castle East of the Sun and West of the Moon; and so she had set out to seek him, and how he had come with her, and would be glad to know if the West Wind knew how to get to the castle.

"Nay," said the West Wind, "so far I've never blown; but if you will, I'll go with you to our brother the South Wind, for he's much stronger than either of us, and he has flapped his wings far and wide. Maybe he'll tell you. You can get on my back, and I'll carry you to him."

Yes! she got on his back, and so they

travelled to the South Wind, and weren't so very long on the way, I should think.

When they got there, the West Wind asked him if he could tell her the way to the castle that lay East of the Sun and West of the Moon, for it was she who ought to have had the Prince who lived there.

"You don't say so! That's she, is it?" said the South Wind.

"Well, I have blustered about in most places in my time, but so far have I never blown; but if you will, I'll take you to my brother the North Wind; he is the oldest and strongest of the whole lot of us, and if he don't know where it is, you'll never find anyone in the world to tell you. You can get on my back, and I'll carry you thither."

Yes! she got on his back, and away he went from his house at a fine rate. And this time, too, she wasn't long on her way.

So when they got to the North Wind's house, he was so wild and cross, cold puffs came from him a long way off.

"Blast you both, what do you want?" he roared out to them ever so far off, so that it struck them with an icy shiver.

"Well," said the South Wind, "you needn't be so foul-mouthed, for here I am, your brother, the South Wind, and here is the lassie who ought to have had the Prince who dwells in the castle that lies East of the Sun and West of the Moon, and now she wants to ask you if you ever were there, and can tell her the way, for she would be so glad to find him again."

"Yes, I know well enough where it is," said the North Wind; "once in my life I blew an aspen-leaf thither, but I was so tired I couldn't blow a puff for ever so many days after. But if you really wish to go thither, and aren't afraid to come along with me, I'll take you on my back and see if I can blow you thither."

Yes! with all her heart; she must and would get thither if it were possible in any way; and as for fear, however madly he went, she wouldn't be at all afraid.

"Very well, then," said the North Wind, "but you must sleep here to-night, for we must have the whole day before us, if we're to get thither at all."

Early next morning the North Wind woke her, and puffed himself up, and blew himself out, and made himself so stout and big, 'twas gruesome to look at him; and so off they went high up through the air, as if they would never stop till they got to the world's end.

Down here below there was such a storm; it threw down long tracts of wood and many houses, and when it swept over the great sea, ships foundered by hundreds.

So they tore on and on—no one can believe how far they went—and all the while they still went over the sea, and the North Wind got more and more weary, and so out of breath he could scarce bring out a puff, and his wings drooped and drooped, till at last he sunk so low that the crests of the waves dashed over his heels.

"Are you afraid?" said the North Wind.

"No!" she wasn't.

But they weren't very far from land; and the North Wind had still so much strength left in him that he managed to throw her up on the shore under the windows of the castle which lay East of the Sun and West of the Moon; but then he was so weak and worn out, he had to stay there and rest many days before he could get home again.

Next morning the lassie sat down under the castle window, and began to play with the gold apple; and the first person she saw was the Long-nose who was to have the Prince.

"What do you want for your gold apple, you lassie?" said the Long-nose, and threw up the window.

"It's not for sale, for gold or money," said the lassie.

"If it's not for sale for gold or money, what is it that you will sell it for? You may name your own price," said the Princess.

"Well! if I may get to the Prince, who lives here, and be with him to-night, you shall have it," said the lassie whom the North Wind had brought.

Yes! she might; that could be done; but when the lassie came up to the Prince's bed-room at night he was fast asleep; she called him and shook him, and between whiles she wept sore; but all she could do she couldn't wake him up. Next morning, as soon as day broke, came the Princess with the long nose, and drove her out again.

So in the daytime she sat down under the castle windows and began to card with her carding-comb, and the same thing happened. The Princess asked what she wanted for it; and she said it wasn't for sale for gold or money, but if she might get leave to go up to the Prince and be with him that night, the Princess should have it. But when she went up she found him fast asleep again, and all she called, and all she shook, and wept, and prayed, she couldn't get life into him; and as soon as the first gray peep of day came, then came the Princess with the long nose, and chased her out again.

So, in the daytime, the lassie sat down outside under the castle window, and began to spin with her golden spinning-wheel, and that, too, the Princess with the long nose wanted to have. So she threw up the window and asked what she wanted for it. The lassie said, as she had said twice before, it wasn't for sale for gold or money; but if she might go up to the Prince who was there, and be with him alone that night, she might have it.

Yes! she might do that and welcome. But now you must know there were some Christian folk who had been carried off thither, and as they sat in their room, which was next the Prince, they had heard how a woman had been in there, and wept and prayed, and called to him two nights running, and they told that to the Prince.

That evening, when the Princess came with her sleepy drink, the Prince made as if he drank, but threw it over his shoulder, for he could guess it was a sleepy drink. So, when the lassie came in, she found the Prince wide awake; and then she told him the whole story how she had come thither.

"Ah," said the Prince, "you've just come in the very nick of time, for tomorrow is to be our wedding-day; but now I won't have the Long-nose, and you are the only woman in the world who can set me free. I'll say I want to see what my wife is fit for, and beg her to wash the shirt which has the three spots of tallow on it; she'll say yes, for she doesn't know 'tis you who put them there; but that's a work only for Christian folk, and not for such a pack of Trolls, and so I'll say that I won't have any other for my bride than the woman who can wash them out, and ask you to do it."

So there was great joy and love between them all that night. But next day, when the wedding was to be, the Prince said: "First of all, I'd like to see what my bride is fit for."

"Yes!" said the step-mother, with all her heart.

"Well," said the Prince, "I've got a fine shirt which I'd like for my wedding shirt, but somehow or other it has got three spots of tallow on it, which I must have washed out; and I have sworn never to take any other bride than the woman who's able to do that. If she can't, she's not worth having."

Well, that was no great thing they said, so they agreed, and she with the long nose began to wash away as hard as she could, but the more she rubbed and scrubbed, the bigger the spots grew.

"Ah!" said the old hag, her mother, "you can't wash; let me try."

But she hadn't long taken the shirt in hand before it got far worse than ever, and with all her rubbing, and wringing, and scrubbing, the spots grew bigger and blacker, and the darker and uglier was the shirt.

Then all the other Trolls began to wash, but the longer it lasted, the blacker and uglier the shirt grew, till at last it was as black all over as if it had been up the chimney.

"Ah!" said the Prince, "you're none of you worth a straw; you can't wash. Why there, outside, sits a beggar lassie, I'll be bound she knows how to wash better than the whole lot of you. Come in, Lassie!" he shouted.

Well, in she came.

"Can you wash this shirt clean, lassie you?" said he.

"I don't know," she said, "but I think I can."

And almost before she had taken it and dipped it in the water, it was as white as driven snow, and whiter still.

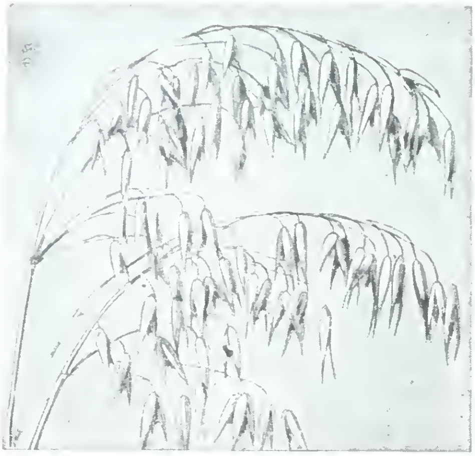
"Yes; you are the lassie for me," said the Prince.

At that the old hag flew into such a rage, she burst on the spot, and the Princess with the long nose after her, and the whole pack of Trolls after her—at least I've never heard a word about them since.

As for the Prince and Princess, they set free all the poor Christian folk who had been carried off and shut up there; and they took with them all the silver and gold, and flitted away as far as they could from the castle that lay East of the Sun and West of the Moon.

THE NEXT STORIES ARE ON PAGE 1965.

SEVEN GREAT CEREALS GROWN FOR FOOD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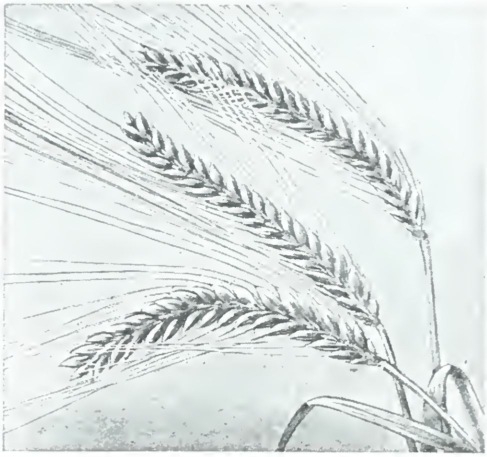
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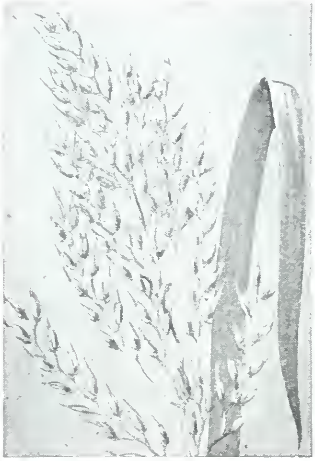
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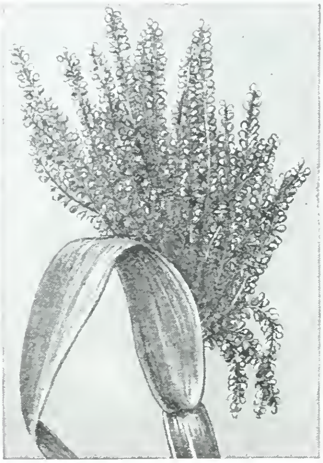
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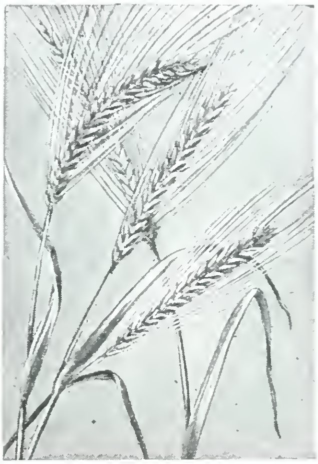
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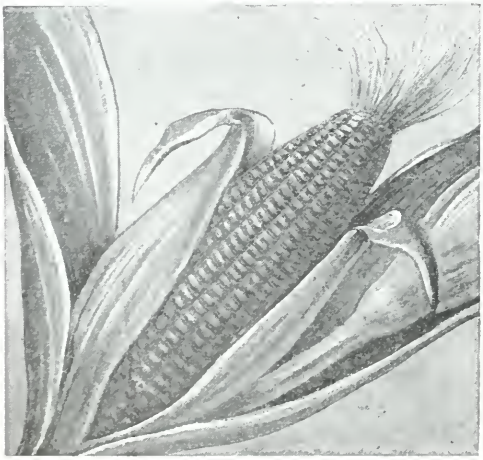
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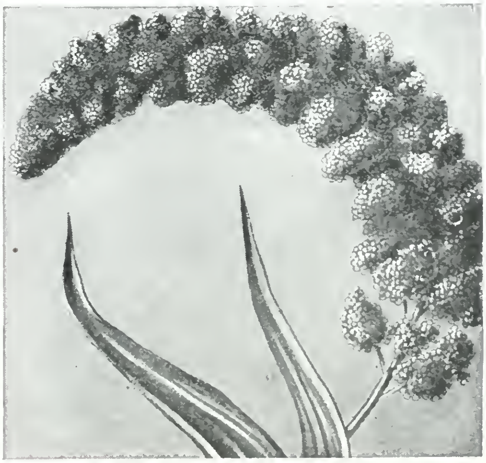
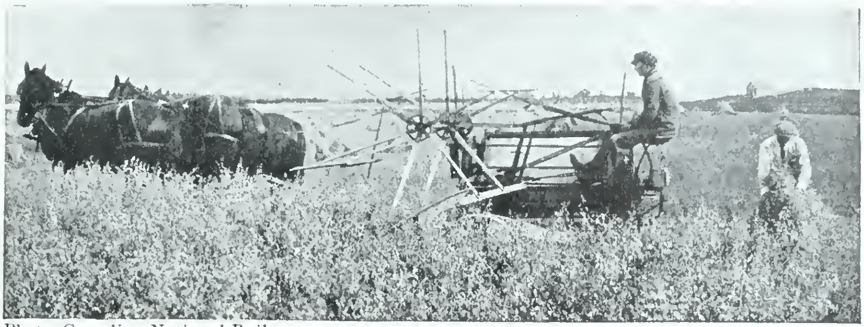

MILLET

Of all food plants the cereals are the most useful, and of all cereals wheat has the greatest value. Other cereals or cultivated grasses are grown, and here are the seven most important cereals after wheat.



Photo, Canadian National Railways.

Harvesting oats in Saskatchewan.

THE GREAT CEREALS

WHEAT, as we have seen, is the most valuable plant food that man can grow, but there are a number of other cereals of very great importance which form the chief food of millions of people in many parts of the world.

Oats and barley are grown in large quantities. In Scotland oats largely take the place of wheat. Oats form a very valuable food, second only to wheat, but they are harder to digest and light bread cannot be made from them. That is why people like the Scots, who live largely on oats, take them in the form of porridge and cakes. Scotland has undoubtedly thrived on oats, as England has on wheat.

It is told of an Englishman traveling in Scotland with a party of friends that he met a Highlander carrying a bag of oats, and said: "In England we use those for feeding horses, but in Scotland they are eaten by men." "Yes," replied the Highlander, "and that is why in England you have such fine horses, and in Scotland we have such fine men."

Up to the World War the world's crop of oats was bigger than the wheat crop, but since the war the oat crop has shrunk, until it is now in some years less than the wheat crop.

The oat is unlike most of the other cereals in that its grain is borne, not in a close spike, but in a branching head, with each ear hanging down on a thread-like attachment. Oats grow best in the colder temperate regions, and will ripen much farther north than wheat. They grow better in Scotland than in England, and flourish almost everywhere in Scandinavia, whereas wheat ripens only in the south of that peninsula. Oats are called "the grain of hardness," and it is a very appropriate name. The grain contains more oil than any other cereal except corn.

Many attempts have been made to trace the original home of the oat, but without success. Possibly our cultivated varieties, of which there are very many, were all derived from the common wild oat, and it is believed that the plant was first cultivated in the temperate and colder parts of Eastern Europe and Western Asia. It does not seem to have been known to the Egyptians or to the ancient Hebrews. The oat plant puts out extensive roots that ramify in many directions, and careful study by botanists has proved that if all the parts of the root of a single oat plant were joined into one long strand this would reach over 150 feet.

Like wheat, oats suffer from a number of enemies, the worst of which is a fungus disease known to farmers as smut. It makes its presence very manifest by changing the healthy heads into masses of black powder, which are the spores of the fungus, and these are scattered broadcast by the wind, so that the disease occurs wherever oats are cultivated. The spores adhere to the seed when it is sown, and germinate along with the oat, producing other spores which inoculate the young oat plant. When the flower is formed the fungus spores are seen in the head of the plant. In recent years this disease has been kept down by sprinkling the seed grain with a chemical solution of lysol or formalin, but before this remedy was discovered the United States alone used to lose nearly $20,000,000 a year through the ravages of smut.

The other important cereal is barley, one of the most ancient of cultivated plants. Three varieties have been found among the prehistoric lake-dwellings of the Stone Age men in Switzerland, and among the relics of the Bronze Age men in Italy.

THE GRAIN THAT FLOURISHES WHERE OTHERS PERISH

Some students think that the ancestor of all the modern kinds of barley was a wild plant still found growing in Western Asia. Others believe that this particular plant came from cultivated barley which has escaped and become wild. Many think that our modern varieties have come from more than one ancestor. The plant grows better in the north than any other grain. It will flourish where no other cereal can be grown.

Barley has a shorter period for root development than wheat, and as a consequence it is what the farmer calls a surface feeder—that is, it has to rely on the surface soil for nutriment, especially for mineral supplies. A field of barley, therefore, needs more mineral manure than a field of wheat. The grain is lacking in gluten, and so cannot be made into a digestible loaf. It is nourishing, however; but the pearl barley sold in shops, and used for soups and gruels, has lost much valuable food substance by the process which ground the kernel into a smooth, polished ball.

The greater part of the barley crop of the world is grown, not for food, but for intoxicating drink. It is chosen by brewers for this purpose because it sprouts more quickly than other grains. In the sprouting process the starch of the kernels is changed into a kind of sugar called maltose, which is needed in making beer. Not many people eat barley now, and most of what is not used for malting is given to cattle. Less is grown than formerly.

THE FALLING-OFF IN ONE OF THE WORLD'S BIG HARVESTS

After wheat, rye contains more gluten than any other cereal, and that is why it was formerly grown so much in Europe for the making of bread in areas where the soil and climate are unsuitable for wheat. In the sandy districts south of the Baltic and the Gulf of Finland it has always provided an abundance of food for the poorer people. The crop has also fallen off in recent years, but much is still produced.

Rye is one of the cereals that has probably not been long in cultivation. It has no name in older languages, and no trace of it has been found on the Egyptian monuments or in the Swiss lake-dwellings. Nor does it seem to be known in ancient Chinese agriculture. Botanists think its parent form grew on the dry mountainous regions running from Southern Europe eastward to Central Asia.

It will thrive on soil too poor and dry for other grains, and has been called "the grain of poverty." The famous black bread eaten in Germany and Russia is really bread made from rye. It is often cut green for cattle food, but the matured straw is not very good for them. Much of it is used in the making of paper and cardboard, for straw hats, and as bedding for stables. Rye has a smaller grain than the other cereals, as may be seen by the average number of grains to the bushel, thus: rye, 1,161,600; oats, 731,000; wheat, 700,000; barley 547,200.

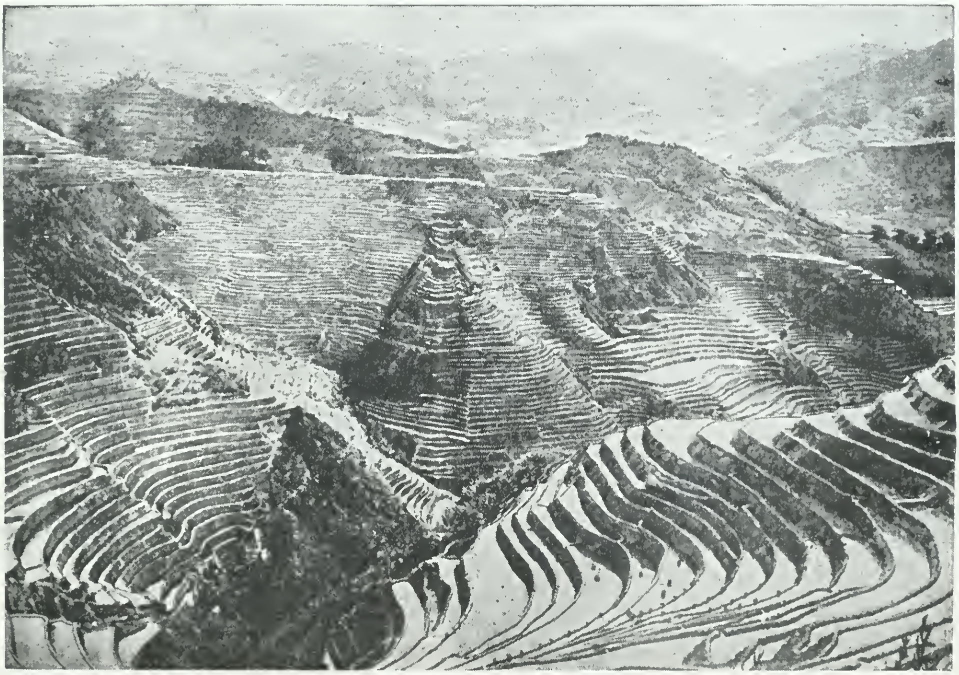
Rye suffers very severely from a fungus disease known as ergot, which not only destroys a large part of the crop, but infects the hay and grass on which cattle feed, and gives them a terrible complaint which is a form of gangrene, very much like foot-and-mouth disease so far as symptoms are concerned. Formerly human beings also suffered from it.

THE WIRY GRASS THAT FEEDS HALF THE HUMAN RACE

The cereals that have been mentioned —wheat, oats, barley and rye—all flourish in Europe, and have been carried thence to America and Australia. Among them wheat stands first in importance, but when the whole world is taken into con-

THE TERRACED RICE FIELDS ON THE HILLS

LITTLE RICE FIELDS AMONG THE MOUNTAINS OF CHINA



THE TERRACED RICE FIELDS OF THE PHILIPPINES, WHERE WALLS IMPRISON THE WATER

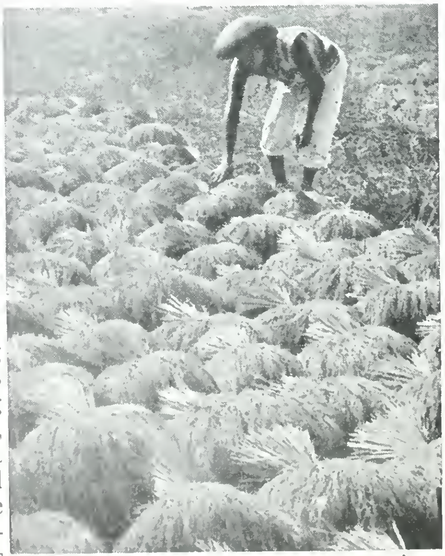
Rice is eaten by more people than any other cereal. Some varieties require much moisture, and the soil in which it is grown must often be flooded. This is managed by irrigation channels, and on hillsides the water is kept from running away by terraced barriers, as shown in the lower picture.

sideration, the next most important cereal is undoubtedly rice. Nearly half the human race is dependent on this grain for its existence, and the rice crop of the world is enormous. So much is eaten by the people who grow it that it is difficult to know exactly how much is grown.

Rice is a grass with long narrow leaves, and the wiry stems grow from two to five feet high. Wild rice is still found in India, but thousands of years ago men began to cultivate it, and the plant spread eastward through China, Japan and Siam to the islands of the Eastern Archipelago. In more recent times it has been carried to America and Australasia.

It is said that the introduction of rice into North America was the result of an accident. About 1694 a sailing ship bound to England from Madagascar made a call in America, and encountering a gale off the coast of South Carolina, put into the nearest port, which happened to be Charleston, for repairs. The captain, to his surprise, found that the governor of the colony was an old acquaintance, and during the exchange of visits the captain gave a bag of rice to the governor, who had it sown on a swampy piece of land belonging to him. The crop was a great success, and the planters of the neighborhood at once began cultivating rice. A dozen years later seventeen shiploads of rice left the port for England, and that was the beginning of the American export trade in grain that has since grown to such enormous dimensions.

A fine field of oats.



Binding up the rice into small sheaves in a Philippine harvest field.

It was by means of slave labor that the rice was cultivated, and after the War between the States and the emancipation of the slaves, the industry was nearly ruined. But it revived steadily, and now rice culture is again a great and growing agricultural industry.

Over two thousand different kinds of rice have been developed, suited to a variety of soils and modes of culture. Most of them are grown on level fields that can be flooded, but there are also upland and hill varieties of rice. The grain is planted and drilled in, and when it has sprouted, the water is let in and kept rising as the stems lengthen. Then the water is run off so that the plants may be hoed; the water is again admitted and keeps rising until flowering time. The grain turns yellow when it is ripe, but before this the water is run off, and after the rice is cut it is stacked for threshing. This is the method followed by American rice-growers.

In China and other lands, where more primitive methods still prevail, the rice is

AMERICA GROWING ITS OWN RICE

AMERICA GROWS THE BEST RICE IN THE WORLD, AND HERE WE SEE NEGROES HOEING IT

CULTIVATING THE RICE IN THE GREAT FIELDS OF THE SOUTHERN STATES OF AMERICA

America grows her own rice, and does this on much more up-to-date lines than the natives of China, Japan and India. But even in America rice cultivation is much behind other cereal-growing in efficiency.

simply broadcasted on a seed-bed, and when the shoots are three inches high the bed is flooded. Then the water is turned off, and as soon as the plants have reached a height of six inches they are transplanted to the swampy fields, generally by women, and are kept in water till they are fifteen inches high. Then they are drained, weeded and hoed, and water is again let in till the harvest.

WHY THE ORIENTAL MIXES BEANS WITH HIS MEAL OR PADDY

The threshing of the grain is done by various methods. Sometimes it is trodden out by oxen or men; at other times handfuls of straw are drawn over narrow slits to comb out the kernels. When the grain is in the yellow husk the rice is called paddy, and there are different ways of threshing or pounding this to remove the husks from the white grain.

Rice is deficient in oil and the food values called proteins, and in northern climates, to supply this deficiency, it is generally cooked with eggs and milk. The Oriental makes good the missing elements with beans, which are rich in protein. From the point of view of both nourishment and flavor, it is far better to eat paddy rice than the white grain freed of its yellow husk, as sold in the grocer's shop.

THE FINE GRAIN THAT COMPLETES ITS LIFE-HISTORY IN TEN WEEKS

Another very important cereal is maize, or Indian corn, as it was called by the Europeans who first went to America and found the natives, whom they supposed to be Indians, eating this new and strange grain. America was its original home and still remains the greatest producer of maize, although the grain has been carried to many other lands and is cultivated in suitable climates all over the world. The United States alone produces about 3,000 million bushels a year.

America does not export a very large proportion of this directly, but indirectly she sends away much of it; for it is fed to cattle and pigs, and the meat is shipped to European ports. There are six distinct kinds of cultivated corn, and many varieties of each; but all have sprung from one kind of wild plant that is now probably extinct, although it is believed to have been a native of Mexico.

Corn is a wonderfully adaptable cereal, and while in the colder areas there is a seventy-day corn which completes its life-history and ripens the grain in ten weeks from planting, there are other varieties with a twenty-foot stalk which take six months to produce a crop. Corn is used in a vast variety of ways. It forms an excellent food, and it is not surprising to know that it was worshiped as a god in olden times in Peru. Hominy is prepared from corn; glucose is one of its products, and a certain variety has in its starch sufficient moisture to explode it when it is heated. This forms the familiar popcorn, so much liked by American boys and girls.

The plant is very beautiful, and a field of growing corn is an attractive sight. If heat and moisture are just right, one can almost see a stalk grow from day to day.

THE CONSTRUCTION THAT PROTECTS A LEAF FROM THE WIND

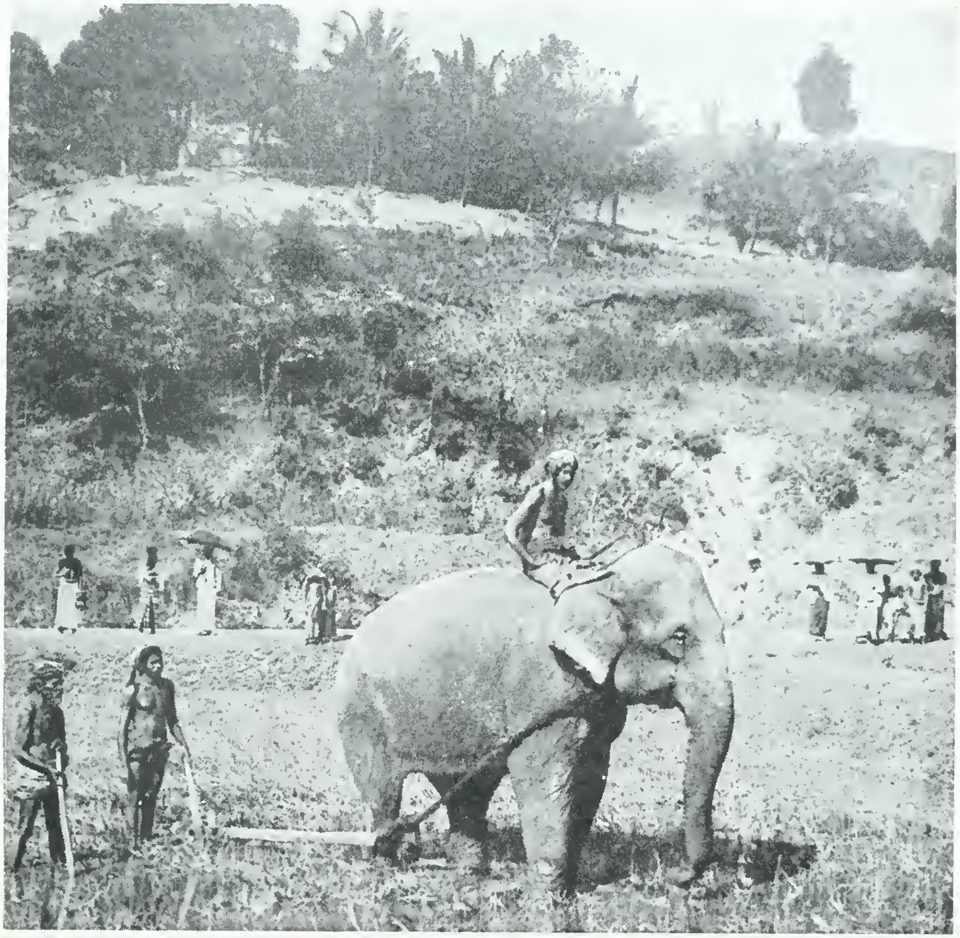
When fully grown, the stalk bears an enormous amount of leaf surface, which accounts for the large amount of starch in the grain. The leaves are the plant's starch factory. The leaf is wonderfully constructed to avert the full force of the wind. It has a spiral twist, and frills enable it to turn to left or right as freely as if it were hinged. While protecting the stalks from the wind, they turn round and avoid the slitting that would be inevitable if they were less flexible. In England corn is grown only as forage for cattle, but the grain ripens in the south of Europe, and much is grown. In Canada corn is chiefly a forage crop but in some sections many bushels are produced. Corn has its many enemies in the United States, the chief of which is the corn-ear worm, and the European corn-borer has invaded the East.

There are several cereals of less importance. In India millet takes the place of rice in the drier regions, and some think this was the first grain man ever took from the wild, and cultivated for his use. Durra, often called African millet, but really one of the varieties of sorghum, is another cereal grown largely in Africa and now introduced into America.

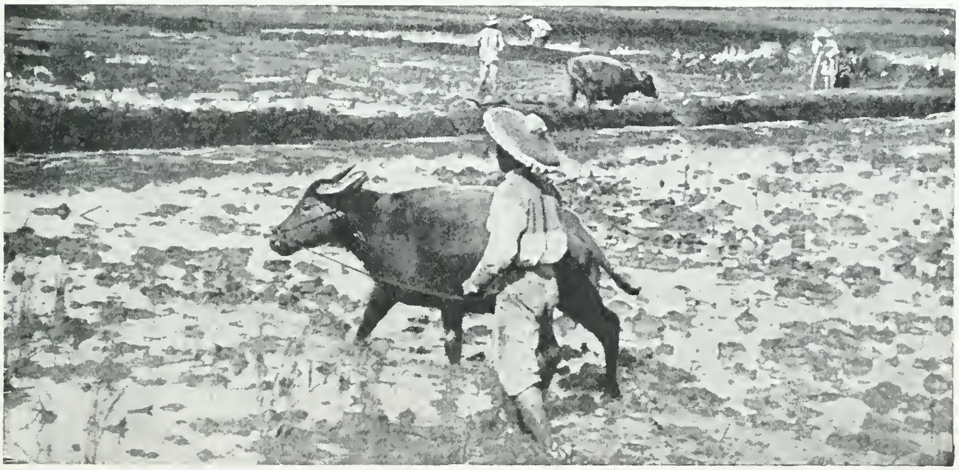
Buckwheat, much used in America, is not really a cereal at all, although very much like one. It is the seed of a plant of the Smartweed Family, a relative of the dock and sorrel. Wild buckwheat still grows on the banks of the river Amur in Manchuria.

THE NEXT STORY OF PLANT LIFE IS ON PAGE 2057.

THE ELEPHANT IN THE RICE-FIELD



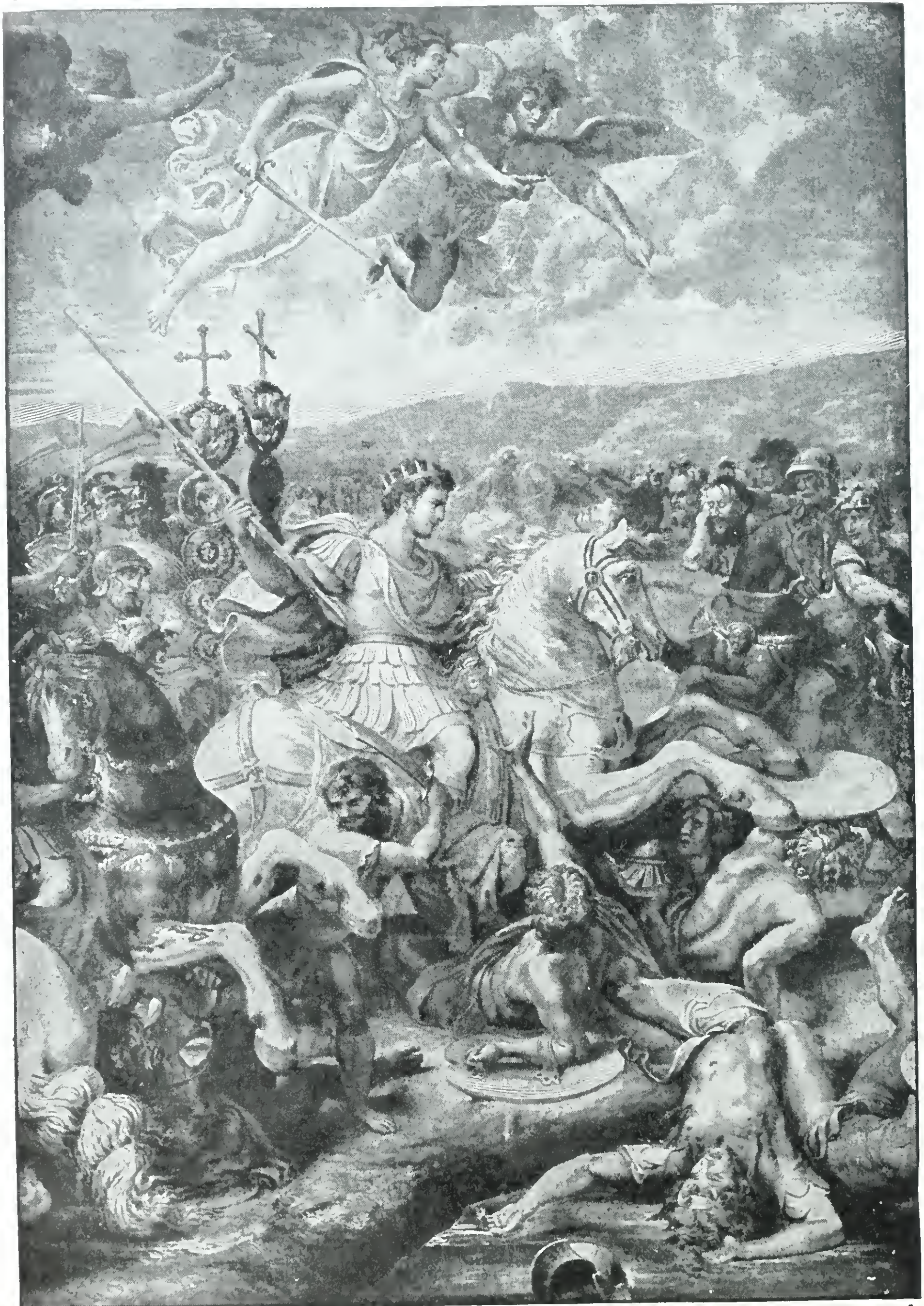
IN CEYLON, WHERE MUCH RICE IS GROWN, THE ELEPHANT IS OFTEN USED FOR PLOWING



IN JAVA THE FARMERS USE BULLOCKS FOR WORKING IN THE FLOODED RICE-FIELDS

Practically every Eastern country grows rice, but in India, where the mass of people live on this useful cereal, over 70,000,000 acres are given up to its cultivation. Ceylon and Java also grow large quantities.

CONSTANTINE LEADING HIS TROOPS IN BATTLE

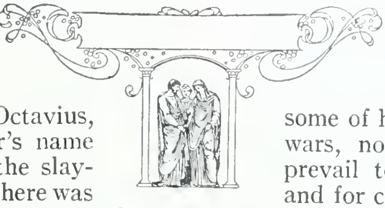


When Diocletian gave up his throne great strife soon arose in Rome as to who should be emperor, and the victor was Constantine the Great. Constantine is famous in the world for many things. He was the first emperor to accept Christianity. Diocletian had tried to destroy it; Constantine made it the state religion of the empire. He built Constantinople, a city containing many beautiful mosques and cathedrals, and here was built up a new empire, which took to itself the power of Rome when Rome's greatness passed away. Constantine's father lived in Britain as a Roman soldier, before he came to the throne, and it is said that he married the daughter of an inn-keeper, who became Constantine's mother, and who now lies in a beautiful tomb among the glorious sculptures and paintings in the palace of the pope.

WHAT THIS STORY TELLS US

FOR 400 years after the birth of Christ Rome ruled almost all the known world, and a line of emperors, beginning with Augustus Cæsar, continued until the power of Rome passed away. Never before, or since, has the world known such remarkable rulers as the men we call the Cæsars. It was in the reign of Augustus Cæsar that Christ was born, and the Roman emperors lived through the most tremendous period of human history, when Christianity was slowly making its way among the people. It is strange that at that great time the world was under the sway of the wickedest rulers that have ever lived; but it is fine to think that the beautiful influence of Christianity spread through the earth until it became stronger than the empire of the Cæsars, which fell to nothing, while Christianity took possession of the world.

THE EMPERORS OF ROME



THE youth whom Julius Cæsar had adopted was sometimes called Cæsar and sometimes Octavius, because his real father's name was Octavius. After the slaying of the great Julius, there was long strife between the young Octavius and Mark Antony, since one or other might rule over the vast dominions of Rome, but not both.

And when at last Octavius got the better of Antony, who slew himself, a Cæsar was once more lord of the world, as we may say; for by this time the rule of Rome had spread over all the lands whose coasts are washed by the Mediterranean Sea; and kings far away in Asia, even if they did not call themselves subjects of Rome, still knew that they must obey her.

Now, would this Cæsar face the mighty task of planning ways by which that great empire might be ruled so that order and justice should prevail? Would he try to carry out such plans? Or would he, like many another, be satisfied to make all he could out of it for his own enjoyment and for the pleasing of his own whims and fancies?

He had been merciless, cruel, selfish. But now a change came. He took up the task; he set aside selfish aims; he learned to curb his fierce temper. With the aid of wise counselors, he laid the foundations of the Roman Empire so firmly that neither the evil rule of some of his successors, nor civil wars, nor foreign foes, could prevail to break it in pieces; and for centuries men lived under the Roman rule secure from violence, as they had lived under no other rule in the past.

Rome was a republic, and the people still hated the idea of a king; yet it was necessary that one man should be the real ruler. The difficulty was got over by giving the one man several different offices and titles. Octavius was called Augustus, the name by which he is generally known, as a compliment, very much as we say "His Majesty."

It was as if he had been made President, or Prime Minister, Speaker of the House, Chief Justice of the Supreme Court, Commander of the Army. Moreover, he had charge of all religious affairs, so that he had in himself the authority of each of the chief offices of state given to him for life, though, of course, a great deal of the real work had to be done by others whom he appointed. Still, he could see that the work was properly done. But because the most necessary power of all was the control of the army, the title of Imperator, which has turned into the word Emperor, is the one which became the most familiar.

Augustus, the first emperor of Rome, gave peace and order to the Roman world. He ordered a census to be taken, and it was while she was going up to Bethlehem for this counting of the people that Mary gave birth to our Lord.

Tiberius succeeded Augustus, whose stepson he was. He was gloomy and morose, and made his life miserable by listening to tale-bearers, until he dared trust no man, even in his own house; and he died at the hands of those about his sick-bed, who probably smothered him.

So Augustus gave peace and order to the Roman world, and prosperity followed; and in his day Rome became a very splendid city, so that it was said of him that he found it built of brick and left it built of marble. He showed favor to great poets, such as Virgil and Horace, and other great writers; so that now we use the name, the "Augustan Age," to describe the time in any country when art and literature have most flourished there. And in his reign something took place of which he never heard, yet which changed the world more than all the statesmanship of Augustus; and that was the birth of our Lord in a far-away province.

THE DEATH OF THE EMPEROR AUGUSTUS AND THE GLOOM OF TIBERIUS

For five-and-forty years Augustus ruled, and the Roman world was well accustomed to the new order of things before he died, old and weary; for all his greatness did not bring him happiness in his home. "Have I played my part well in the comedy?" he said, as he lay dying. "Then clap your hands, and so farewell." No one doubted that another emperor must succeed him, or that the successor must be his stepson Tiberius.

Now, Tiberius was not young; he was gloomy and morose. Yet he had served the state well, commanding great armies in distant lands where other generals had met with disasters. The old emperor had respected him, but no one among either populace or nobles loved him; and it is unlucky for him that the great Roman historian Tacitus has told the story of his reign in such a way that his name has become odious to all men. Yet some people say that this is not just, and that away from Rome people could see and feel that his government was firm and wise.

But in Rome itself, and, above all, among all those people who had to do with the emperor's court, his reign was grievous. For, knowing that men did not love him, Tiberius listened readily to tale-bearers, and there grew up a hateful company of "informers" who were ready to lie away men's lives that they themselves might get rewards for their seeming loyalty. And the better a man was, the more likely was he to have wicked enemies who would charge him with plotting against the emperor. So no man's life was safe.

THE UNHAPPY TIBERIUS AND HIS YOUNG NEPHEW GERMANICUS

With fair words, crafty and evil men persuaded Tiberius to put his trust in them, and, most of all, a certain Sejanus, who became the captain of the guard. But a day came when certain proof was brought to Tiberius that

Sejanus himself was plotting his murder, and Sejanus in one day was smitten down from his high estate and put to a shameful death. Yet after that Tiberius did not dare to trust any man at all. The victims of his fears multiplied, until he, too, died, it may be of disease, or it may be by the hands of those about his sick-bed, who, men believed, smothered him with pillows.

He had no son; but there had been a nephew of his who was called Germanicus for the fame he had won in the wars with the German barbarians. Germanicus died while quite a young man, and some fancied that he was poisoned by the emperor's planning, since Tiberius feared any man who was a general favorite like Germanicus, and, above all, one who was beloved by the soldiers.

THE MADNESS AND WICKEDNESS OF "LITTLE BOOTS," THE EMPEROR CALIGULA

However, he left a young son, whose name was Gaius, but who was called by the soldiers Caligula, which means "little boots," because when he was a tiny boy in his father's camp he used to wear little boots just like those the soldiers wore. Now Caligula, hardly more than a boy, was made emperor for the sake of the memory of his father Germanicus.

But very soon Caligula had a serious illness, and after his illness he became quite mad, though he was still clever, so that people did not see at first that he was really mad. In his madness he thought that he was a god, and, moreover, among many other wild fancies he had a horrible delight in killing people. One day he even said he wished all the people in Rome had only one neck among them, so that he might cut off all their heads at once. Thus it seemed that in a few months Caligula would shed more innocent blood than ever Tiberius had spilled in his long reign, and therefore certain officers, fearing for their own lives, banded together and put an end to his life.

Since this deed was done without warning, none knew who should now be made emperor, or whether there would be a new emperor; and for a time it seemed that all law and order were over; but the soldiers of the guard resolved to show their own power, and began to pillage the palace.

HOW THE TREMBLING CLAUDIUS HID BEHIND A CURTAIN IN THE PALACE

While they were pillaging, someone saw the feet of a man who was hiding behind a curtain. The soldiers pulled him out, and when they saw that it was Claudius, the uncle of Caligula, —a feeble man and thought to be of no account —they cried out, mocking, that he should be

Caligula succeeded Tiberius, whose great-nephew he was. He became emperor when quite young and after an illness went mad. He was cruel, and all Rome was glad when he was slain.

After Caligula's death, someone saw a man hiding behind a curtain. Soldiers pulled him out and found it was Claudius. They carried him off and made him emperor. He had a timid manner and was thought half mad, but as emperor he made some wise changes.

the new emperor, and carried him off to the camp. And since none could command the guard, Claudius was proclaimed emperor.

Though weak in character, he was a kindly man, fond of books and learning, interested in building and improving conditions of living. Among other public works, he had a harbor built, and finished the construction of two great aqueducts for carrying fresh water into Rome. Some of the beautiful arches of one, Aqua Claudia, are still standing on the plain east of Rome. Claudius granted to people living in the provinces the rights of Roman citizens, and in his reign the conquest of the island of Britain was really begun. But the four wives he married, one after another, and the favorites he trusted were evil-minded. They used their influence to bring harm upon many innocent persons and caused much bloodshed, for which the emperor bore the blame. At last, his wife, Agrippina, poisoned him, that she might make her son, Nero, emperor in his place, for she had been married and had a son before she became the wife of Claudius.

NERO'S WIFE THE CRUEL EMPEROR NERO NERO'S MOTHER

Nero succeeded Claudius, whose stepson he was. Claudius was poisoned by his wife to make room for Nero, and Nero murdered her. Nero is shown here twice, with his mother on one side and his wife on the other. He murdered them both. He built himself a house of gold, and it is said that he set Rome on fire and harped while it burned. At last he fled from Rome in terror, and slew himself.

There was no one whom the soldiers cared to make emperor except Nero, so it was he who followed Claudius. At first, while he was quite young, he allowed his tutor, the wise Seneca, and the grave Burrus, the captain of the guard, to rule well enough; meanwhile he spent his own time in studying art and music till he came to fancy himself a wonderful artist and musician. But presently he was not contented with that, and showed himself the most cruel and bloodthirsty of all the emperors, so that his name is a byword to this day.

First of all, he had his own mother murdered, but that vile crime was forgiven him because she had been so evil a woman. There was a great fire which burned down half the city of Rome, and men said that this was his own doing, and that while the flames raged he sang and played upon his harp the song of the burning of Troy. But, fearing the rage of the people, he pretended that it was the Christians who had done this thing, and many of them were hunted out and burned to death or flung to the lions in the great amphitheatre to amuse the populace. Yet the world was less shocked by his cruelties than by what it deemed the shame of the Roman emperor appearing on the stage.

So many and so shocking were these acts, so many noble men and women were his victims, that they cannot be recounted; but at last news came that a general named Galba, in Spain, had revolted. And when men knew that someone had ventured to rise up against Nero, there were none who would stand by the cruel tyrant; the guards themselves deserted the emperor. In terror he fled; but when he knew that his hiding-place was found, he dared rather to die by his own hand than to fall into the hands of his foes—pitied by none save himself. His last thought and his last words were that the world was losing a wonderful artist.

Now in quick succession three men claimed the empire. First, the old soldier Galba, with his legions from Spain; then, a young man named Otho, chosen by the guard at Rome, who overthrew Galba; then, the glutton Vitellius, chosen by the armies in Germany, whose troops overthrew Otho. But then there came one stronger than any of these, the skilled general Vespasian, who commanded the Roman armies in the East. For it was clear enough that none but a conquering soldier could now grasp the imperial sceptre.

Vespasian and the two sons who ruled after him are called the Flavian emperors, because the family name was Flavius. Vespasian was not of high birth; but he gave Rome what she most needed at the time—a chief who meant to restore order and good government, who had no thirst for blood, and did not care to waste on display and luxury the money that was needed for more useful things. When once he had crushed resistance to his rule, he was done with violence and bloodshed. Though men laughed at his manners, which were homely and even vulgar, he cared nothing about that, nor for jests at his eagerness to get money. The money was needed, and if he got it by sordid means, he met reproaches by saying that "the coins smelt well enough"; and it was well spent. So the ten years of his rule were good for Rome.

Vespasian, a skilled warrior, made himself emperor and ruled the empire well for ten years, following three short reigns after Nero's death.

After him his son Titus reigned only for a short time. He had won fame as a soldier, during his father's rule, by the great siege of Jerusalem, which had rebelled; and when he conquered it, he dealt with it mercilessly, laying it in ruins and carrying away the treasures of the Temple to Rome. But when he became emperor, he was resolved to win fame for kindness and mercy, so that when a day passed on which he had set no wrong right and relieved no distress, he said to those about him, "My friends, I have lost a day." We remember Vespasian and Titus especially for their having built one of the biggest structures in the world, the Colosseum at Rome. This huge Flavian Amphitheatre was long used for races, athletic games, combats between gladiators, or fights of wild beasts. In the reign of Titus came the fearful eruption of Vesuvius which buried Pompeii and other towns.

Titus' brother Domitian, who succeeded him, began his reign well enough, but presently turned to evil ways after the manner of Tiberius, persecuting the Christians among his other ill-deeds. Yet, in his time there was good rule in the provinces; and in Britain, especially, the famous Agricola won much honor by his just government. Domitian, in his turn, was murdered, after reigning fifteen years.

For more than a hundred years after Vespasian made himself emperor, Domitian was the only one of all the emperors who was not counted among the good princes; and the five who came after Domitian are often called "five good emperors." The first, indeed, whose name was Nerva, hardly counts. He was an old man already when the Senate offered him the throne—the soldiers made no disturbance—and his rule was very short. But just as Julius Cæsar adopted the young Octavius as his son, so Nerva adopted as his son a great soldier, Trajan, who was trusted by the army; and thus it was made certain that Trajan would be emperor after him. Trajan was one of the very best—a man who sought, above all things, to spread justice among his

Titus succeeded Vespasian, whose son he was. He destroyed Jerusalem, but when he became emperor he was kind and merciful, and whenever a day passed without a good deed done he would say, "My friends, I have lost a day."

Trajan enlarged the empire until Rome could not rule it; so that, although Trajan won great victories, the wars which ended his reign were a failure, and he died with foes on every side.

subjects. Moreover, Trajan was a great warrior, more at home in the camp than in the court. and waged successful wars with the barbarian tribes in Dacia beyond the river Danube. These wars were recorded upon a great column set up in Rome, which is called Trajan's column.

HOW TRAJAN ENLARGED THE EMPIRE UNTIL ROME COULD NOT MANAGE IT

Now, there was one thing Trajan did which was not wise, for he sought to enlarge the borders of the Roman Empire, and to carry its sway as far into Asia as Alexander the Great had gone. Yet the empire was already so vast that it was hard enough to keep armies in all its borders and hold in check the barbarians who lived beyond. So, although Trajan went to the East and defeated the armies which met him in battle, the wars which ended his reign were a failure; and when he died there were dangerous foes rising up against the empire on every side.

However, he had made choice of a wise and able general and statesman to succeed him as emperor. No one opposed the accession of Hadrian, who, at the time, was in command of the army in the East. But he had already seen the mistake Trajan was making at the end of his reign. So the first thing he did was to make peace with the border nations, fixing the bounds of the empire where they had been before, though he took care to let everyone see that his armies were going to be just as strong as before. Then he went back to Italy, and devoted himself to making still better the good arrangements for government which Trajan had brought about.

HADRIAN, WHO TRAVELED THROUGHOUT THE EMPIRE AND WENT TO BRITAIN

But the most remarkable thing he did was to take long journeys. Although traveling was no easy matter in those days, when men had to go from place to place either on foot or on horseback, or perhaps carried in a litter, he traveled over the Roman Empire, and saw with his own eyes how each part of it was governed. He even went to Britain, and built there a famous rampart between England and Scotland, which to this day is called Hadrian's Wall. It is a pity that at the end of his life he suffered from a disease which often made him lose his self-control and do cruel things. For there are many people who think that there was no other emperor who did so much as he to establish the security and the strength of the empire, and the justice of the Roman rule.

Though Hadrian made the task of ruling easier for his successors, yet the task could never be a light one; and it was well that the two who followed him were both wise and resolute, for they were also, both of them, men who would rather have chosen to live virtuous and untroubled lives as private citizens than to bear the burden of rule. The first, chosen by Hadrian, was Titus Aurelius Antoninus, surnamed Pius for his virtue. In his reign the Roman governor ruled over a part of Scotland as well as England, and a new rampart, called the Wall of Antonine, was raised, crossing Scotland. Antoninus Pius adopted as a son, to help him and afterward to succeed him, the famous Marcus Aurelius.

MARCUS AURELIUS, THE EMPEROR WHO WROTE A BOOK THAT WE CAN BUY TO-DAY

These two great Antonines are reckoned for all time as the type of noble princes, since their care was altogether for the people over whom they ruled, and not at all for themselves. This is true, although Marcus Aurelius dealt hardly with the Christians and persecuted them, because it seemed to him, having no knowledge of the truth of their doctrine, that they were teaching men to defy the law and to be impious. Yet he wrote a book of Meditations which people love and treasure even now: it is so full of wise thoughts and noble counsel, very like the teachings of the Christian faith.

It is strange, too, to think that he wrote much of this wise book while he was in camp at the head of armies in wild regions, whose fierce border tribes were again rising up to do battle against the might of Rome; for, though Marcus Aurelius loved peace, he showed himself a skilled leader in war. And when he died all men mourned for him. Yet he, too, made one unhappy blunder, for he named to succeed him his son Commodus, who was almost as bad as his father was good.

THE TYRANT DIOCLETIAN, WHO TRIED TO DESTROY CHRISTIANITY

Now, during the next hundred years there were a great many emperors, some of whom reigned for no more than a few months or even weeks. Only two or three reigned for so long as ten years. For whenever an emperor died—and a good many were murdered—two or three generals were usually proclaimed emperor, each one by the troops in that part of the empire where he was in command. But at the end of a century a soldier named Diocles, who changed his name to Diocletian, succeeded in making himself emperor, and from his time there was no more pretense that the government of Rome was really a republic in which a man happened to hold a number of important offices all at

Hadrian, who succeeded Trajan, brought back the peace that Trajan took away. He traveled over the Roman Empire, and saw how it was governed, and he even went to Britain, which the Romans ruled then, and built a wall across it, some remains of which can still be seen.

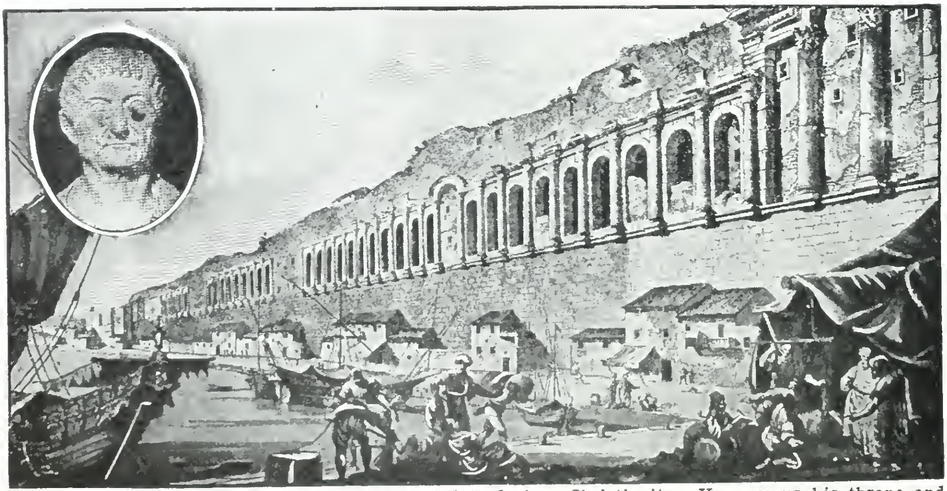
Antoninus Pius succeeded Hadrian, who chose him to rule over Rome. He was a good ruler.

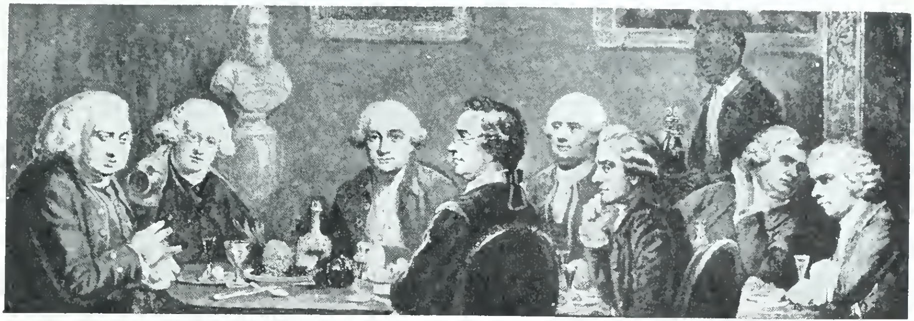
once, but it might almost be said that the emperor's will was law. Now, Diocletian is also famous for this—that he was the last of the emperors who tried hard to destroy Christianity. By this time the Christian community had become large and powerful enough to sway the minds of men; so that the persecution under Diocletian was the worst the Christians ever endured. Yet he could in no wise crush them.

Now, when Diocletian thought that his work for Rome was completed, he resigned his power; but the plan he had made to provide for a peaceful choice of successors failed. And so there was strife again between the masters of the different quarters of the empire, each fearing that, unless he made himself chief of all, he would lose his own rulership. In this strife the victor was he whom we call Constantine the Great, the battle in which he overthrew his chief rival is called the battle of the Milvian Bridge, and the victory of the Milvian Bridge was also the victory of Christianity. For Constantine had already shown good-will to the Christians; and before the battle, as he related himself, he thought he saw a vision—the vision of the Cross, and over the Cross words which mean: "In this sign thou shalt conquer." From that day he took the Cross for his standard; and, having become emperor, he gave honor to the Christian faith, and made it the State religion of the Roman Empire. Therefore the State was no longer hostile to the Christian Church. And this also Constantine did—in place of Rome he made the city of Byzantium the chief city of the empire, and gave it the name of Constantinople. After his time it was the Byzantine Empire that ruled what we call the Roman world, till the West broke from the East; and thenceforth the might of Rome was not the might of the State, but the might of the Church.

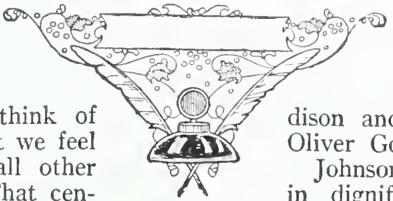
The wise and gentle Marcus Aurelius.

THE NEXT STORY OF MEN AND WOMEN IS ON PAGE 1991.


Diocletian was the last of the emperors who tried to destroy Christianity. He gave up his throne and built himself the greatest palace in the world, part of which is seen here. Its walls still stand, and within them stands the town of Spalato, on the coast of Dalmatia. It is wonderful to walk about the streets of this old town and think that 1,500 years ago it was the private house of a private man.



DOCTOR JOHNSON AND HIS FRIENDS



THE years between 1750 and 1785 are so full of the personality of one man, when we think of English literature, that we feel compelled to group all other names around his. That central figure is Doctor Samuel Johnson, the most extraordinary character in the English world of books.

Why should he be set on a pedestal in the midst? He certainly was not the best writer of his day. Though he wrote verse and prose which have the ring of worth, the chief reason why his work is still read to some extent is not its natural attractiveness. Rather is it curiosity because he, and no one else, wrote it.

Judged by its style, most of Doctor Johnson's writing was bad rather than good. It had its advantages, but it was weighty to the borders of pomposity. It ought always to be mentioned to young writers with warnings rather than with enthusiasm. It tended to establish a bad fashion, and, indeed, ruined the literary work of admiring imitators.

Why, then, should we speak of a supposed Age of Johnson? He wrote fair verse, but nothing to compare for a moment with the charm of Goldsmith's easy, natural flow. He saw the revival of nature poetry in James Thomson, and the exquisite pictures in words of Thomas Gray and William Collins, and did not even appreciate them. He wrote formal essays in his periodical called The Rambler, but they were not to be compared with the essays written in earlier years by Addison and Steele, or later by Oliver Goldsmith.

Johnson's chief writings were in dignified, balanced prose. But this never attained the stately march of his contemporary, Edward Gibbon, nor still less the strength and beauty of the language of his friend, Edmund Burke. He made one attempt, in Rasselas, at romantic fiction, but was only an amateur compared with the new school of novelists, such as his early patron, Samuel Richardson, Henry Fielding, Tobias Smollett, Oliver Goldsmith and his little friend, Fanny Burney. He made a little much-needed money by his one tragedy, Irene, produced by the friend of his youth, David Garrick; but as a dramatist he was completely outclassed both by Goldsmith and Sheridan.

The best work he ever did was his Lives of the Poets, much of it sound criticism; but it was mixed with an unusual share of violent prejudice. His Dictionary was a drudging form of labor, of somewhat commonplace usefulness. It was valuable chiefly because it called other men to labor more successfully in the same literary field.

Yes, the fact is that Samuel Johnson never deserved, by his actual writings, the place given him by his own generation and confirmed by afterages.

Yet he most emphatically did be-serve the position he held for thirty years or more as the central literary figure of his period. It is as a man, as a character, rather than by anything that came from his pen, that he lives, justly and triumphantly, the most commanding figure of an age rich in notable men.

BOSWELL'S WONDERFUL BIOGRAPHY AND ITS FINE PICTURE OF DOCTOR JOHNSON

We have had Doctor Johnson described so that we know him as a man as well as if we had lived with him and his circle of friends, in the wonderful biography of him written by his Scottish admirer and friend, James Boswell. Undoubtedly Boswell's Life of his hero is the most complete biography in the English tongue. It pictures with minute and enthusiastic faithfulness a man who is continually interesting and stimulating. We are glad to know him exactly as he was in the midst of his friends, many of them famous men, to hear his talk, forgive his weaknesses, love his manly character, and feel toward him as the people of his circle felt when they gathered around him.

The perfection of Boswell's book is that it allows Johnson to live again before our eyes as a real man. It enables us to understand why it was that he was acknowledged by his contemporaries as the great man of his age. In no sense did Boswell make Johnson. He simply mirrored him for us to see him. Seeing him, we know, as the men about him knew, that here was a master man, powerful in mind, great in soul, and worthy to be borne in everlasting remembrance. This, although as a writer he did not produce such masterpieces as came from the pens of Gibbon and Goldsmith, Gray, Burke or even Boswell himself.

THE DAY WHEN DOCTOR JOHNSON REMEMBERED HIS FATHER

Born in Lichfield on September 18, 1709, the son of a bookseller, Samuel Johnson was a devourer of books from his boyhood. He grew up big, strong and fearless, but was handicapped all his life by dim sight, and tormented by a blood disease, causing à tendency to depression. At Lichfield Grammar School he was the best scholar, and left there for Oxford, but his father could not support him through a full university course. Johnson's appreciation of his father is shown, and his own unshrinking bravery in doing what he thought right, by an act of penance which he imposed on himself when he had become famous. He recollected that once, when he was a boy, he had objected to accompanying his father to Uttoxeter market, where his father kept a bookstall on market-day. Thinking back, he realized that it was pride that had made him disobedient, and so, as an old man, he tried suitably to punish himself. His own account is: "I desired to atone for this fault, so I went to Uttoxeter in very bad weather, and stood for a considerable time bareheaded in the rain on the spot where my father's stall used to stand. In contrition I stood, and I hope my penance was expiatory." None of the stories of Johnson shows better than this the simple sincerity of his character.

After disappointing experiences as a schoolmaster, he went to London at twenty-eight to make his way as a writer. In a terrible line he has described the frequent fate of the men who wooed fortune with their pens in those days:

Toil, envy, want, the patron, and the gaol.

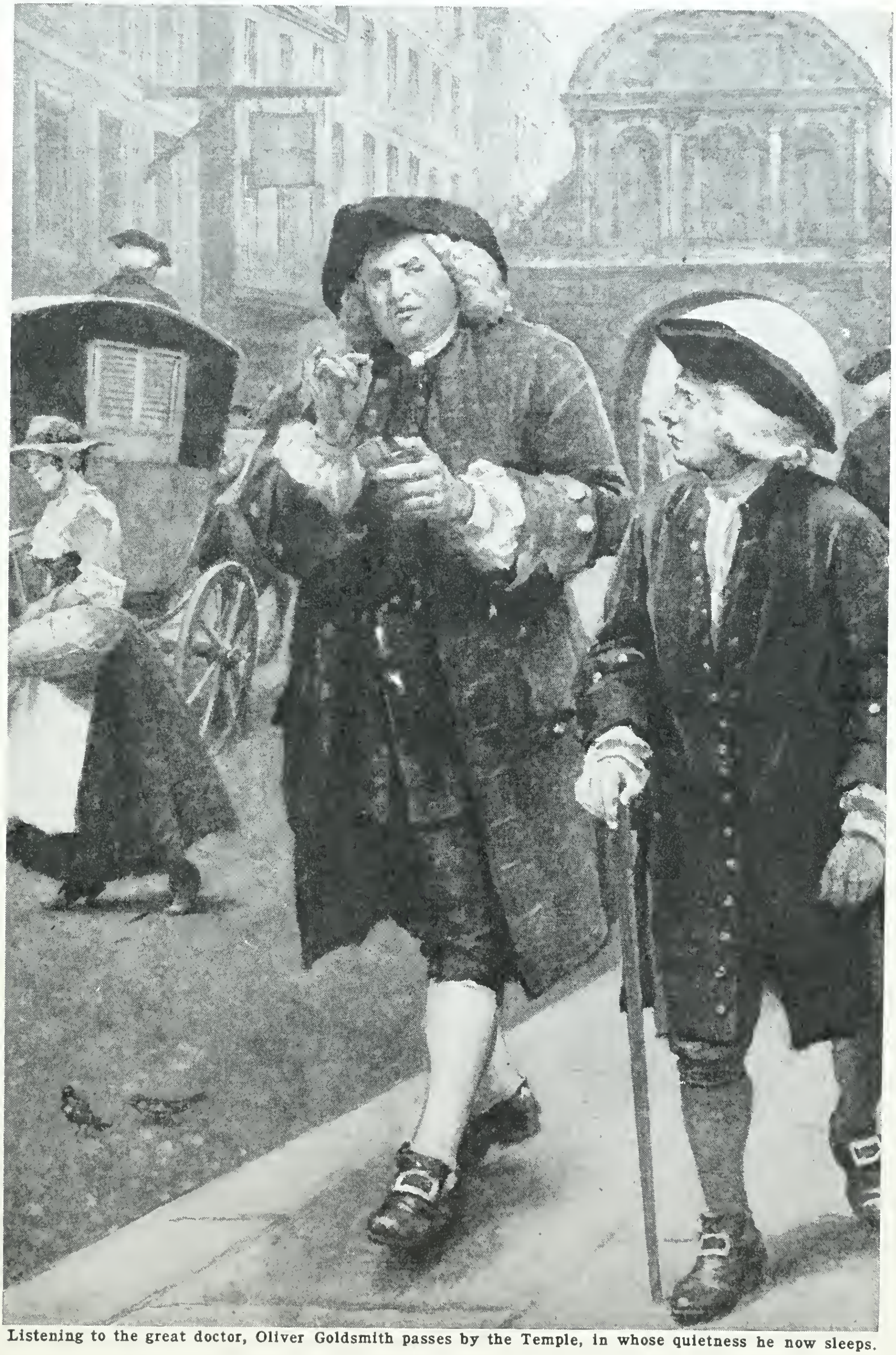
THE FAMOUS LETTER THAT DOCTOR JOHNSON WROTE TO LORD CHESTERFIELD

Johnson spent years in a stern struggle with poverty, from which he emerged slowly, till, at forty-six, on the eve of the publication of his Dictionary, he could proudly rebuff Lord Chesterfield, who wished to patronize him by having the work dedicated to himself. Here is a part of the famous letter he wrote to Chesterfield. It marks the happy time when literature became free from patronage by the wealthy, and it is an illustration of Johnson's writing in his most dignified vein.

> Seven years, my lord, have now passed since I waited in your outward rooms, or was repulsed from your door; during which time I have been pushing on my work through difficulties of which it is useless to complain, and have brought it at last to the verge of publication without one act of assistance, one word of encouragement, or one smile of favour.
>
> Is not a patron, my lord, one who looks with unconcern on a man struggling for life in the water, and, when he has reached the ground, encumbers him with help?
>
> The notice which you have been pleased to take of my labours, had it been early, had been kind; but it has been delayed till I am indifferent and cannot enjoy it; till I am solitary and cannot impart it; till I am known and do not want it.

Seven years after writing this letter, Doctor Johnson was given a pension of

DOCTOR JOHNSON AND OLIVER GOLDSMITH



Listening to the great doctor, Oliver Goldsmith passes by the Temple, in whose quietness he now sleeps.

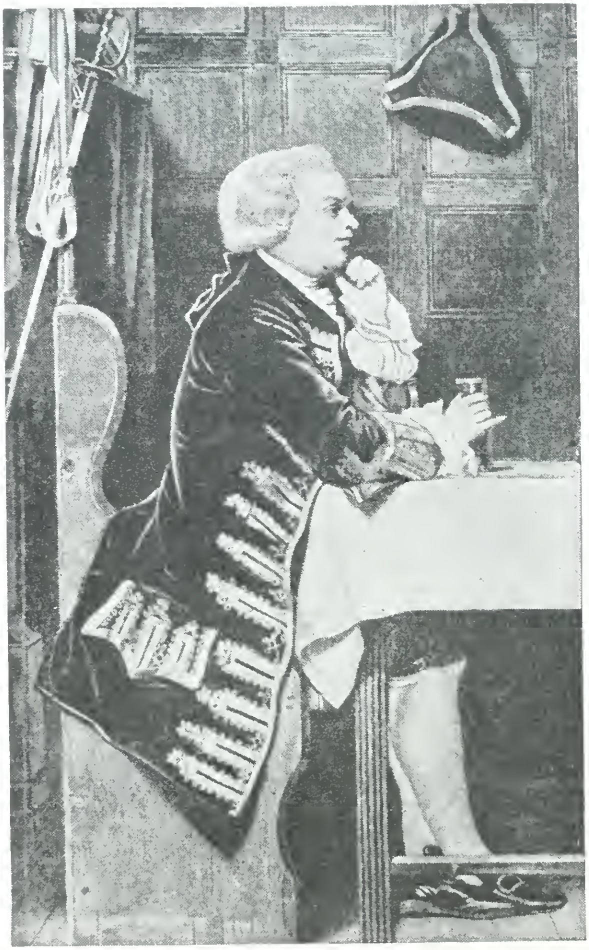
$1,500 a year by the king, and during the remainder of his life—twenty-two years—he lived in comfort, till his death at the age of seventy-five. It was during the last twenty-one years that he was known by his almost idolatrous admirer and biographer, Boswell.

A literary club had been privately formed, and to it came Reynolds, Burke, Goldsmith, Gibbon, Garrick, Adam Smith, Bishop Percy, Sheridan and others, and Boswell was present as often as possible. He noted down, night by night, the conversations he heard, always with a view to showing how his hero Johnson shone above all the rest.

One of the first engagements as a writer that Johnson obtained after he arrived in London had been the reporting of the speeches in Parliament in The Gentleman's Magazine. Reporting was not then allowed, but Johnson went to the House and brought away the speeches in his big memory. He reproduced them as an account of the Debates in the Senate of Lilliput, from which his readers could understand in outline what had been said and who had said it. He was, it is true, very one-sided, and he afterward admitted that he had been careful in his reports to make his own side have the best of the argument—a very bad thing, of course, for a reporter to do. Boswell imitated him in this, while faithfully picturing the friends of his hero. Johnson's was the Tory side throughout. In all things he stood firm for the old ways. In politics and religion and social usages he had no belief in unsettling changes.

Often he was wrong; but everyone realized that he was completely honest. He fought new-fangled notions fiercely and continuously. The king, the constitution as it then existed, and the Church of England were good enough politics for him, and he had little patience and a good deal of suspicion for all who were less content than himself with these three things. He could never forgive Milton, for example, or judge him fairly, because Milton was a Nonconformist, and what we now call a Radical. But Johnson softened somewhat with the years, and his last book, The Lives of the Poets, though still one-sided, was by far his best book, in fairness and in style.

Toward the close of his life, as friends, including admiring women like Mrs. Thrale and Fanny Burney, gathered round him, he became less rough and overbearing, and everybody knew that Goldsmith was right when he said that he had nothing of the bear but his skin. Indeed, he was one of the kindest and most merciful of men, and he spent his money in helping all kinds of poor and unfortunate people. His rudeness never lessened the love of his friends. Rough, untidy, awkward and odd though he was, he had a heart of gold, and his sturdy



Oliver Goldsmith in town.

common sense won for him universal respect. He had a deep though fearful piety. Everyone felt that underneath an almost repulsive exterior here was a great and good man. He remains *the one Englishman who talked his way into everlasting fame.*

The great rival of Johnson, in the eyes of Boswell, was Oliver Goldsmith, and well he might be if writing were the test applied. Johnson himself, however, was too truly Goldsmith's friend to trouble about rivalry.

The best illustration is his account of how he sold Goldsmith's Vicar of Wakefield, and delivered the unbusinesslike poet from his difficulties of the moment. Here is his own account, as recorded by Boswell.

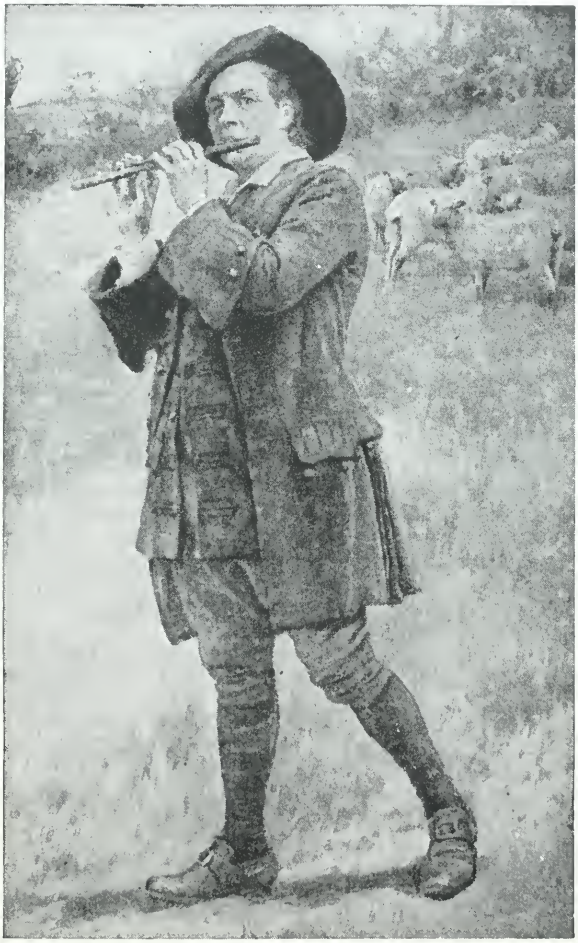
"I received one morning a message from poor Goldsmith that he was in great distress, and as it was not in his power to come to me, he begged that I would go to him as soon as possible.

"I sent him a guinea, and promised to come to him directly. I found his landlady had arrested him for his rent, at which he was in a violent passion.

"I perceived that he had already changed my guinea, and had got a bottle of Madeira and a glass before him. I put the cork in the bottle, and desired him to be calm, and began to talk to him of the means by which he might be extricated.

"He then told me he had a novel ready for the Press, which he produced to me. I looked into it and saw its merit. I told the landlady I should soon return, and having gone to a bookseller, I sold it for £60. I brought Goldsmith the money, and he discharged his rent, not without rating his landlady in a high tone for having used him so ill."

But Johnson believed in Goldsmith as a poet even more than as a prose writer. With his usual air of authority he acknowledged him as "the greatest poet since Pope."



Oliver Goldsmith and his flute.

It is easy to see that Goldsmith would appeal to Johnson by the regularity of his verses and clearness of his thoughts. This regularity is noticeable in Johnson's own poems, London, and The Vanity of Human Wishes.

But it is less easy to see why he remained so blind to the merits of Gray, who lived almost at the same time. On hearing that Gray's works were to be published complete, he exclaimed, "I think we have had enough of Gray. One bad ode may be suffered, but a number of them together makes one sick."

The irregularity of the ode in form may have had some effect in producing this strange criticism. But against the form of the Elegy Written in a Country Churchyard no such charge could be laid; yet Johnson would only allow that two of the stanzas were poetry, and he described their author as "a dull fellow, dull in a new way."

Yet after more than a century and a half of criticism, Thomas Gray remains to-day one of the most choice of English poets. None of his writings is disregarded, while Samuel Johnson's verse really lives only in about the same number of stanzas as those to which he condemned Gray.

Of the prose writers who surrounded Johnson, Gibbon we will speak of when we consider the historians, and Burke when we come to the philosophy of politics—a field he holds almost alone. There remains only Oliver Goldsmith to be more fully looked at here.

JOHNSON'S EPITAPH TO GOLDSMITH IN WESTMINSTER ABBEY

The best brief summary of what Goldsmith was as a writer is given in Latin on the tablet to his memory in Westminster Abbey, and Johnson was the writer of it. His friends entreated him to write it in English, but he declined to "disgrace the walls of Westminster Abbey with an English inscription." It is in English, however, that we best know it:

> Oliver Goldsmith, poet, naturalist, historian, who left scarcely any style of writing untouched, and touched nothing that he did not adorn; of all the passions, whether smiles were to be moved or tears, a powerful yet gentle master; in genius, sublime, vivid, versatile; in style, elevated, clear, elegant. The love of companions, the fidelity of friends, and the veneration of readers, have by this monument honoured his memory.

In the whole range of literature there is no tribute truer, whether it be judged by feeling or by literary expression. What kind of man was he who won this exquisite epitaph, and whose grave beside the Temple Church in London is visited oftener, perhaps, than the grave of any other English writer except Shakespeare and Charles Dickens?

THE IRISH GENIUS WHO TURNED HIS ADVENTURES INTO LITERATURE

No man who has won fame by his pen has succeeded more completely than Oliver Goldsmith through putting his own experiences into his writings. Whether he wrote as a poet, a dramatist, a novelist or an essayist, it was his own character and doings, or the characters of his friends, that he was weaving into his various writings.

Born in Ireland the son of a clergyman, the place of his birth (Pallas, in Longford) became the Deserted Village of his most popular poem, and his father the beloved country parson who was "passing rich on forty pounds a year." When he went to Dublin for a smattering of learning his adventures as he rode to and from college furnished him with the chief scenes and incidents in the play She Stoops to Conquer, with which in later years he captured London.

After he had left Dublin (and later Edinburgh) without completing his education as a doctor, he wandered to and fro over Europe to various universities in and between Holland and Italy, often dependent for food by the way on his playing of the flute. It was these experiences that he wove into his first poem, The Traveller, and put into prose in his Inquiry into the Present State of Polite Learning.

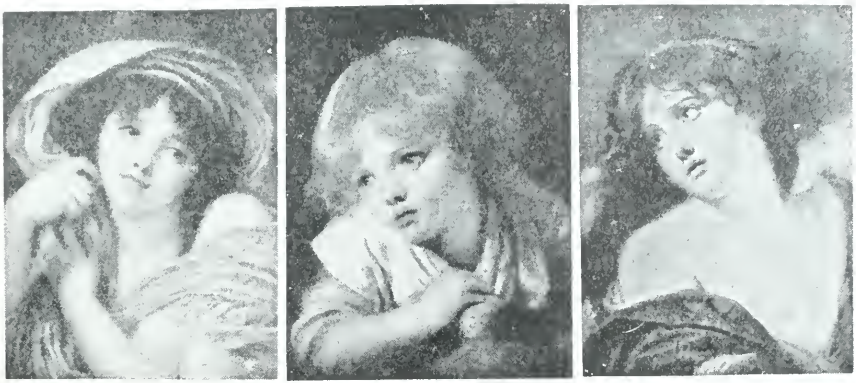
Then he returned to London to drudge in poverty, sometimes as a doctor in the slums, sometimes as an usher in a school at Peckham, sometimes as a writer for magazines or newspapers. Still he was gathering up the experiences which made his essays the most human of their kind. In his work The Citizen of the World he pictures a Chinese visitor to London who, because of his simple mind, is very often taken in. This simplicity belongs to Goldsmith himself.

THE WATCHFUL EYES AND TENDER HEART OF GOLDSMITH

When he turns to fiction and charms the world afresh—as it has been charmed ever since—with his story The Vicar of Wakefield, it is again his own father who gives the title to the tale and who is its real hero. The easily duped son Moses is none other than the easily duped son of his own house—Oliver himself.

With watchful eyes and tender heart Oliver Goldsmith passed through the world, gently making fun of the weaknesses in his own character, which he could not conquer, and turning all he saw and felt into literature such as is described in Johnson's epitaph. No doubt he was weak of will, vain in small ways, wildly extravagant whenever his sympathies were excited, never wise on his own account. But no man who ever wielded a pen was better loved by the people whom he teased by his unpracticalness, and nobody has more successfully transformed his own life into imperishable literature.

THE NEXT STORY OF LITERATURE IS ON PAGE 2027.



Three heads painted by Jean Baptiste Greuze.

THE RISE OF FRENCH ART

THE real art of the French people, which is one of the glories of Europe, was centuries in growing and developing its own form.

France lay on the high road between Flanders and Italy, and we know that these two widely separated countries were for a long time the strongholds and the outposts of European painting.

Not content with their own work, Italian artists put packs on their backs and set off across the continent to see how those marvelous Flemings created their pictures. And artists from the Low Countries went to Italy on a kind of pilgrimage of their own, fired by a purpose as earnest and devout as that which led pilgrims to Rome. We can trace the highway whereon men walked, dreaming of beauty, by the beautiful things they have left behind—at Paris, Lyons, and in Provence, where they broke their travels for a time and worked and studied.

The French thus received the impress of the art of both countries; and it seems strange that they should not have shaped it to their own individuality. But for several generations the kings of France, who were the chief patrons of the arts, were on the field of battle and had other things to think of besides painting and sculpture. And when the country at length had rest from war and rumors of war and could turn to the occupations of peace, French art could scarcely be said to exist. We have seen how a beginning had been made by Froment and Fouquet and the Clouets in the fifteenth and sixteenth centuries; but after their time came a period clouded by imitating and by following Italian influence of a wrong sort.

In 1589, when Henry IV came to the throne, he hastened to take up the intermittent work of earlier kings. As soon as he had finished fighting, this Henri Quatre set about making Paris beautiful.

The memory of this beloved monarch still lives on the Pont Neuf, which he had built across the Seine four hundred years ago and ornamented with an equestrian statue of himself cast in bronze.

The revival of Catholicism in the early seventeenth century led to the building of churches in various parts of the country, and this was of immense importance to painters, as altarpieces and panels were presently needed.

The king encouraged wealthy citizens to build beautiful houses and adorn them with statuary and pictures. Marie de' Medici, the queen who survived him, erected just outside Paris the Palace of the Luxembourg. She looked about in France, and finding no one worthy, sent for Rubens to decorate her long gallery.

Other Flemish artists, like Philip de Champaigne, followed him, and French painters became their pupils. A great many less important artists of Flanders and Holland had already settled in France. Nearly all French artists imitated either the Flemish or the Italians. If they could not go to Italy to see the work of these men, they took inspiration from engravings.

We can easily see the reason why these two great forces, Flemish and Italian art, controlled French art for a long time. Art in the Netherlands, like art in Italy, had lived through a long apprenticeship and knew all there was to be known. Art in France had had no such student years, and French painters were like pupils who had skipped many lessons and wanted to copy what other scholars had done, instead of going back to the A B C. The result of this was several generations of poor, imitative work.

An artist called Jean Cousin, who was born in 1500, was said to be the founder of the National School. But it is clear, on looking back, that for some time after Cousin's day the National School did not yet exist. Cousin's famous picture, which made men talk a great deal, is called The Last Judgment, and is now in the Louvre; but we can see that it might quite easily have been painted by an Italian.

THREE BROTHERS AND THE FINE SIMPLICITY OF THEIR ART

Henry IV and his son Louis XIII had encouraged art; but Louis XIV dictated it. There was no public opinion except that of the king. Mazarin and Colbert, the ministers of the youthful Louis, had created in 1648 an Academy of Sculpture and Painting and Architecture which officially directed the art of the country. This institution lasted till the Revolution; yet, in spite of it, French art as we know it, grave, sonorous, dainty, grew to power and triumphed.

In the meantime the poorest generation had yielded one or two notable men. There were the brothers Le Nain, all three gifted artists of the seventeenth century. The Italian realist Caravaggio seems to have inspired much in their pictures, for they tried to get his effects of dark, sombre color lighted up in a striking way. The result was that their painting was often dark and heavy. The brothers painted some very fine portraits and studies of peasants, such as The Blacksmith, in the Louvre, and the Portrait Group in the National Gallery, London.

The Le Nain pictures can never be overlooked in a study of French art, if only because they seem so out of place in an artificial age. Like the artists of their day, the brothers borrowed freely of the learning of Italy and the Netherlands, but their fine simplicity and ruggedness and their lack of affectation are their very own. The two outstanding French painters in the seventeenth century were Nicholas Poussin and Claude Lorrain, who both lived almost all their lives in Italy.

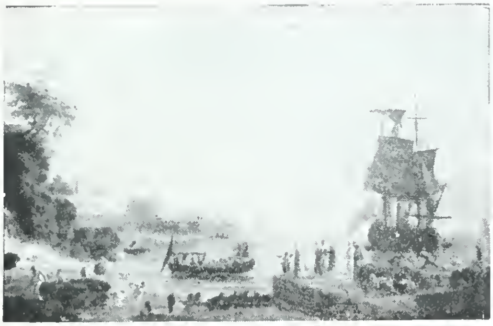
NICHOLAS POUSSIN, AND HIS PASSION FOR CLASSICAL ART

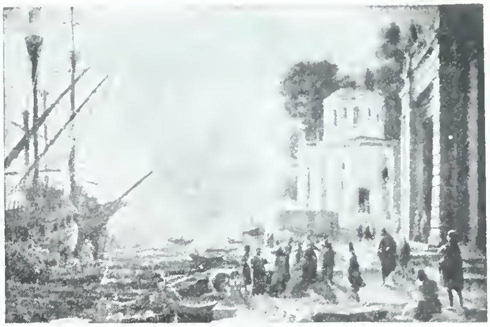
Poussin, who lived from 1594 to 1665, is one of the memorable figures in the story of French art. He was the first great classical painter, and had a strong influence on the men who followed him. All his life he had had an intense love for ancient history and classical art and legend. He painted a large number of pictures of old story and mythology; and these canvases seem to have been worked on partly by a historian who had a passion for being right in details, and partly by an artist who had a passion for magnificent landscapes and scenes of bygone times.

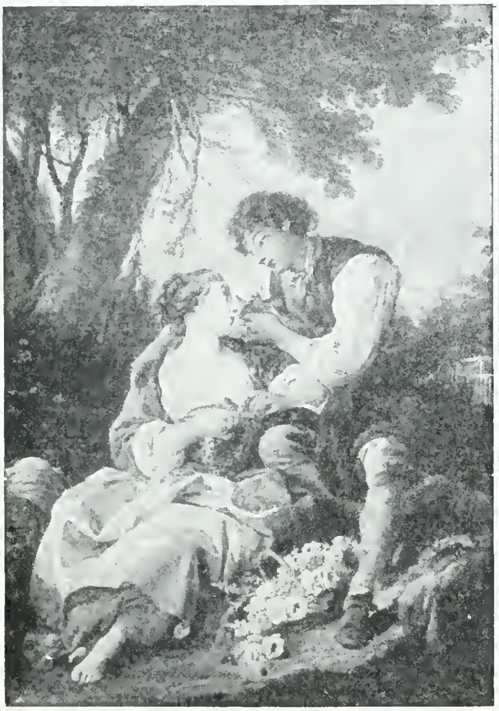
The beauty of the Italian landscape, which always seems in itself a picture, he used in a new way. It was not simply a setting for his figures, nor were the figures simply an adornment for the landscape. The two elements were used side by side to make a picture of charm and beauty.

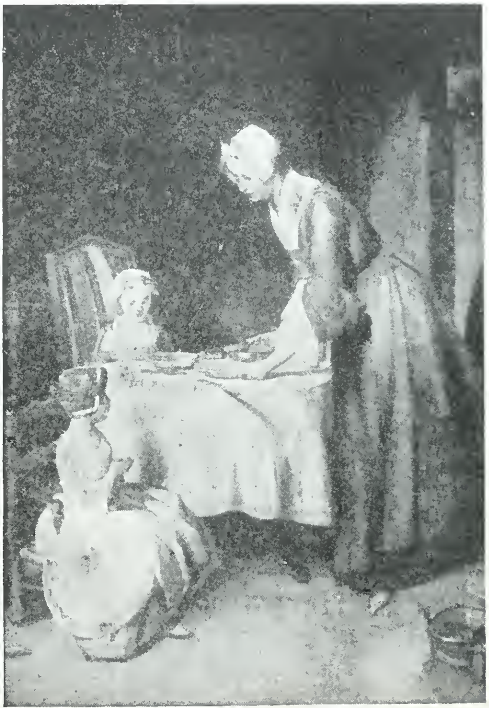
The figures themselves are like sculptured figures in a carved relief. For Poussin had studied form by modeling and by drawing from sculptured low reliefs. The figures and their relative positions are distinguished by contrasts in light and shade, rather than by an effect of atmosphere. Like Raphael, Poussin was born with a gift for making beautiful compositions in his space, and his study of Raphael's paintings added knowledge to his gift. If you look at the picture Shepherds of Arcadia, on page 1875,

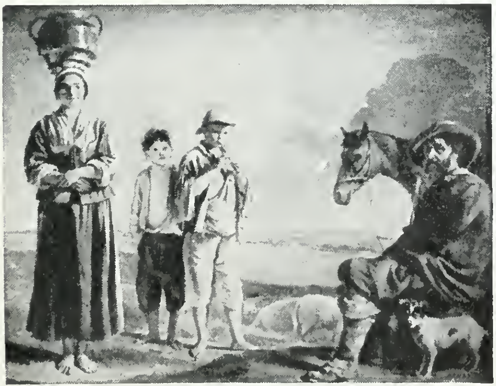
PICTURES OF OLD FRANCE

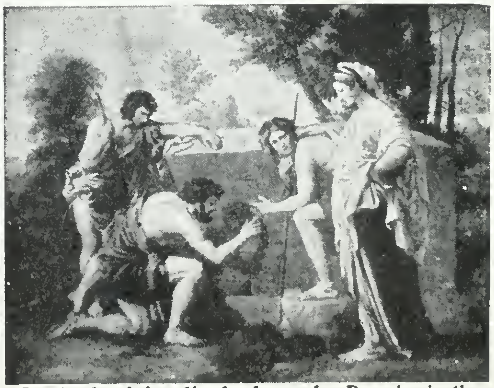

A Mediterranean Scene, by Joseph Vernet.


The Landing of Cleopatra, by Claude Lorrain.


A Pastoral Idyl, by François Boucher.


Grace before Meat, by Chardin.


A Piper among the Hills, by one of the Le Nain brothers.


Shepherds of Arcadia, landscape by Poussin, in the Louvre.

you see that it clearly illustrates all the qualities we have noted in Poussin's art.

Besides the well-known classical scenes, he painted some remarkable pictures on Bible subjects, such as The Deluge, in the Louvre. They are nearly as fine as Raphael's Bible.

CLAUDE LORRAIN, PAINTER OF A SUN-LIGHTED WORLD

Claude Lorrain, who lived from 1600 to 1682, was an artist of another kind. He, too, loved classical landscapes and subjects, but less as a historian and more as a dreamer. He had an intense love for the tranquil sunny landscape of Italy and the Mediterranean coast. By his imagination he devised ideal views, so that we think "if there is no spot on earth like this, there ought to be one." His love of natural beauty showed itself in the light and space which flooded and made charming his most artificial scenes. Claude Lorrain, the Frenchman, and Turner, the Englishman, who lived two hundred years later, each dreamed the same dream of a sun-washed world.

Living in Italy, Poussin and Lorrain escaped the thraldom of the Academy. Most of their fellow-painters were absorbed into this association, which was presided over by an artist called Charles Le Brun. Some of them were famous in their day and are still remembered, such as Le Sueur, Mignard, Hyacinthe Rigaud. Le Sueur painted a great many subject pictures, among them twenty-two paintings dealing with the life of St. Bruno. Mignard produced some fine compositions and some portraits, which are a little too charming to be strong. Rigaud also painted portraits; in fact, every painter painted portraits in the reign of Louis XIV. The magnificent portraiture of France had its beginnings then.

THE ARTIFICIALITY WITH WHICH GREAT ART COULD NOT LIVE

The king was never tired of seeing his own likeness in color or stone, and the aristocracy and wealthier citizens were not slow in following his lead. Nearly all the portraits painted reflect the pompous artificiality of the age. Hyacinthe Rigaud's pictures of Louis and of Bossuet are good examples of that particular branch of art in the seventeenth century.

But it is in Charles Le Brun that we can best see reflected the spirit of the "Century of Louis XIV." Le Brun was painter to the king, director of the Academy, head of the Gobelins tapestry school founded by Louis, and, with Colbert, director of the decorations at Versailles, the huge palace which the "sun-king" built outside Paris. Colbert, the mighty statesman, worked very hard indeed in the interests of art in France, and spared no expense to help painters and sculptors toward the fulfillment of a high ideal.

But the whole age was soaked through with false splendor, and in such an atmosphere great art could not thrive. We can see it all in Le Brun's work. He could draw very well, it is true; he was a good decorator of spaces, and could adapt a subject to its setting. But his painting was uninspired; and this might be said of most of the men who held the Academy honors in his day. Moreover, all his life he was trying to please the king.

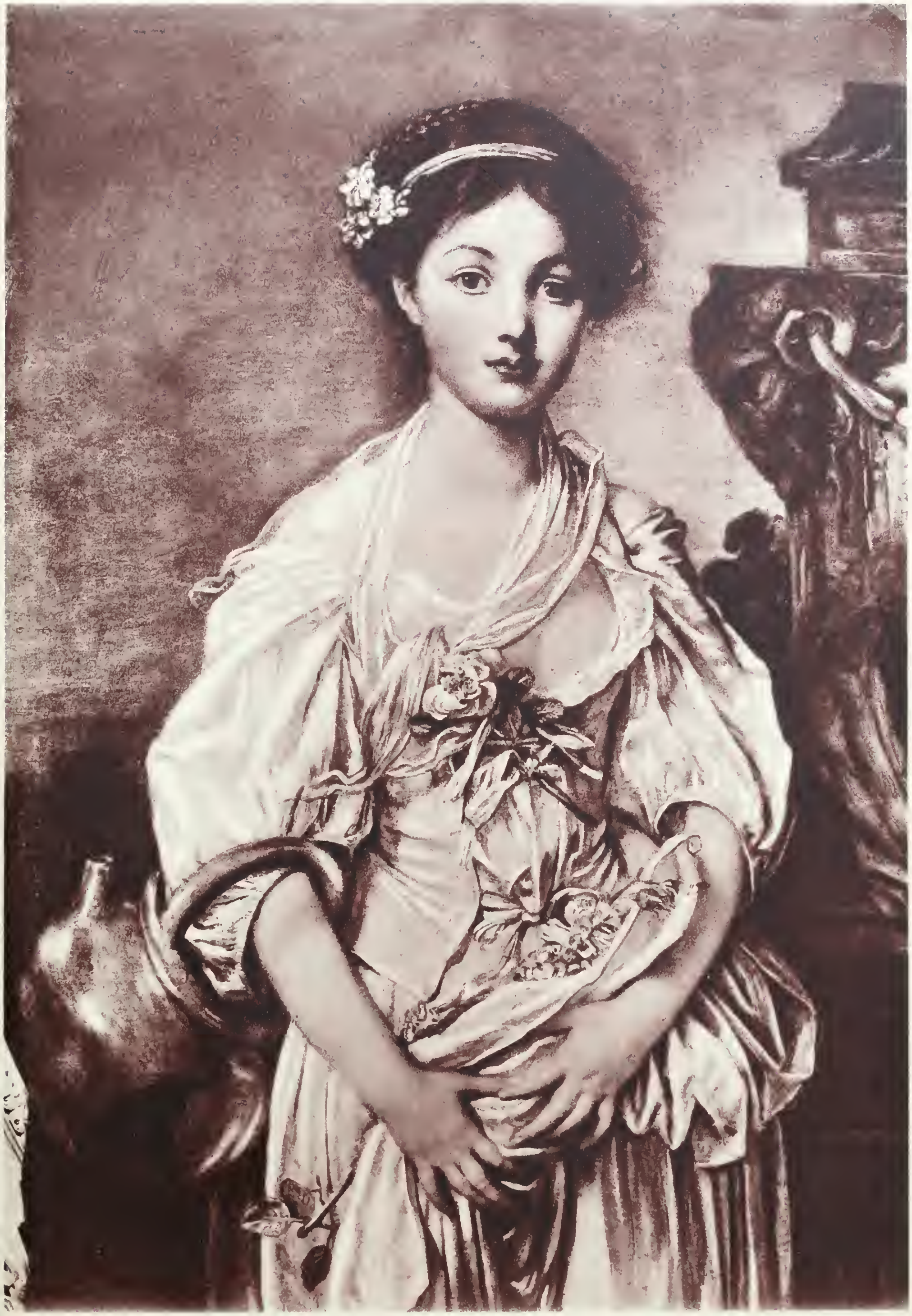
We are here face to face, in this reign of Louis XIV, with one of the astonishing events of Europe. It has rarely happened that so much wealth, so much success, so much false greatness has been crowded into the lifetime of one king.

AN ASTOUNDING THING THAT HAPPENED TO THE ART OF A NATION

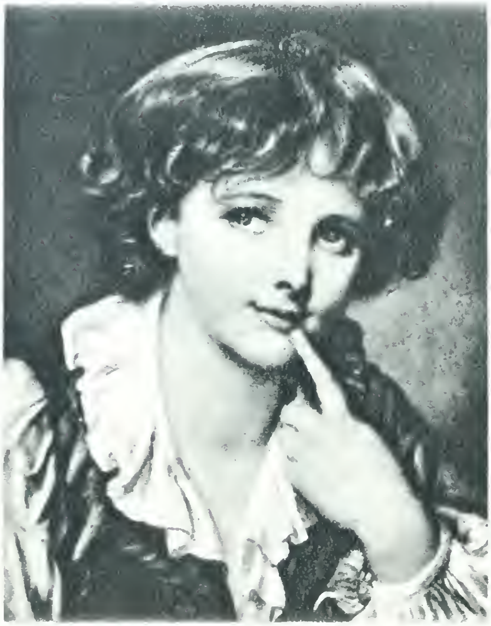
The face of Paris had changed, and the capital had become a centre of art activities and scholarships; a great country became aroused, almost as if it were one man, to an interest in books, painting, sculpture and architecture. If it had not been that Louis said: All these pictures, these statues, these bindings, must glorify *me;* instead of painting the heroes of the old world, paint *me;* leave France a monument of *me*—the story of French art might have been very different. A whole colony of artists were pressed into service at Versailles; beautiful scenes of Greek mythology were painted, with the king in place of the hero.

As the long reign drew to a close, true art began in a quiet, hidden way to thrive. Paris had become a school not only of artists but of collectors and lovers of pictures and statues. Already men's eyes were turned away from Versailles, where courtiers still did homage to a worn-out old man, and were watching eagerly for the dawn of freedom's day. To do justice to Louis and his ministers we must remember that if they did not produce great art, they gave men practice in art. The French style and the mastery of technique

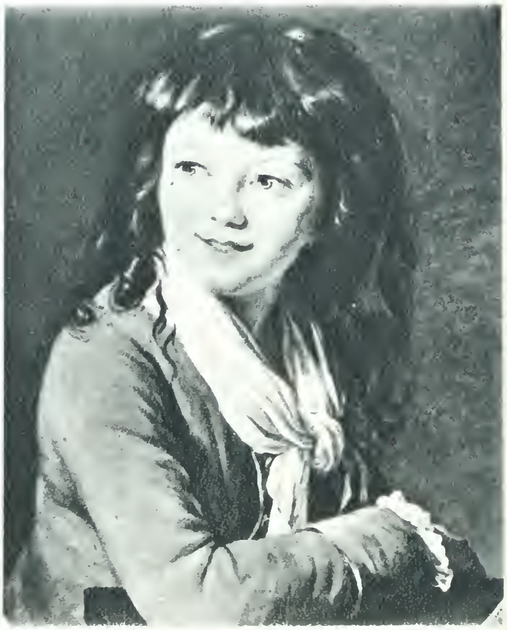
A FEW PICTURES BY FRENCH ARTISTS



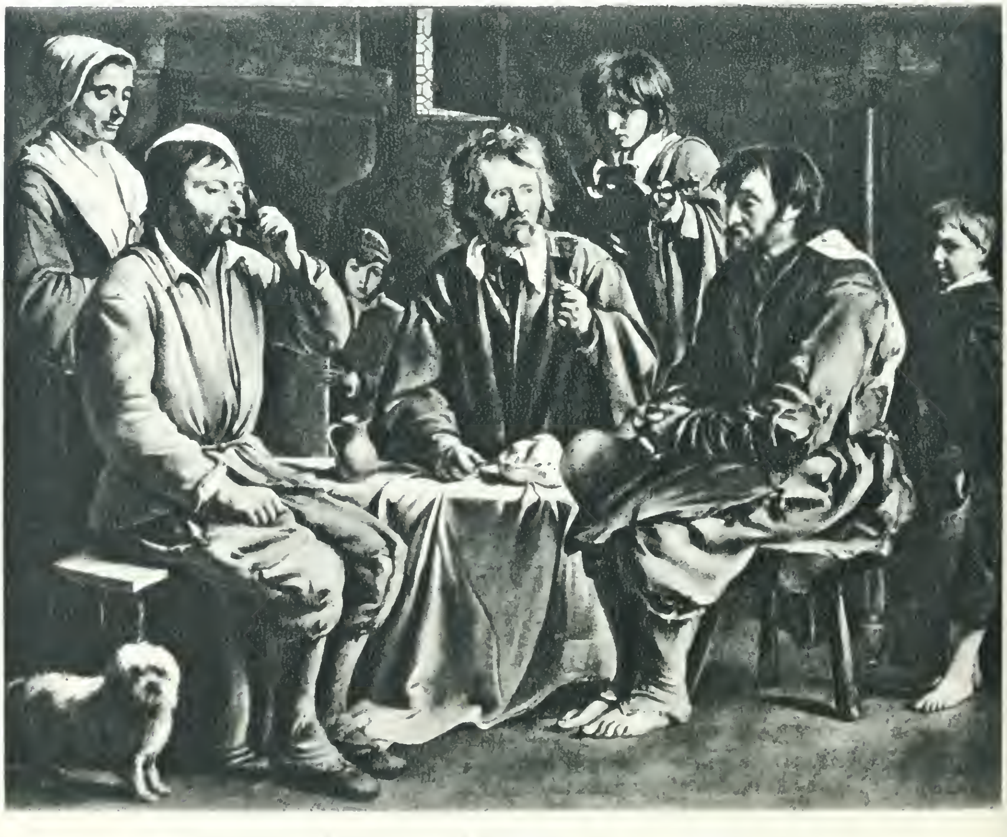
THE BROKEN PITCHER, A FAMOUS GREUZE PORTRAIT, IN THE LOUVRE



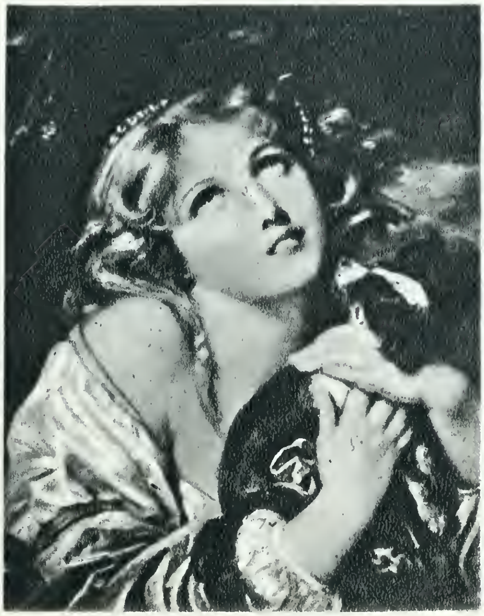
THE YOUNG ROGUE, BY GREUZE, IN THE WALLACE COLLECTION



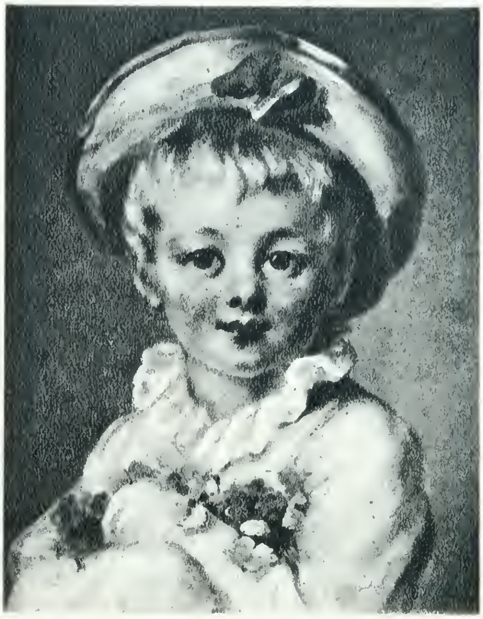
PORTRAIT OF THE COMTE D'ESPAGNAC AS A BOY, BY VIGEE LE BRUN



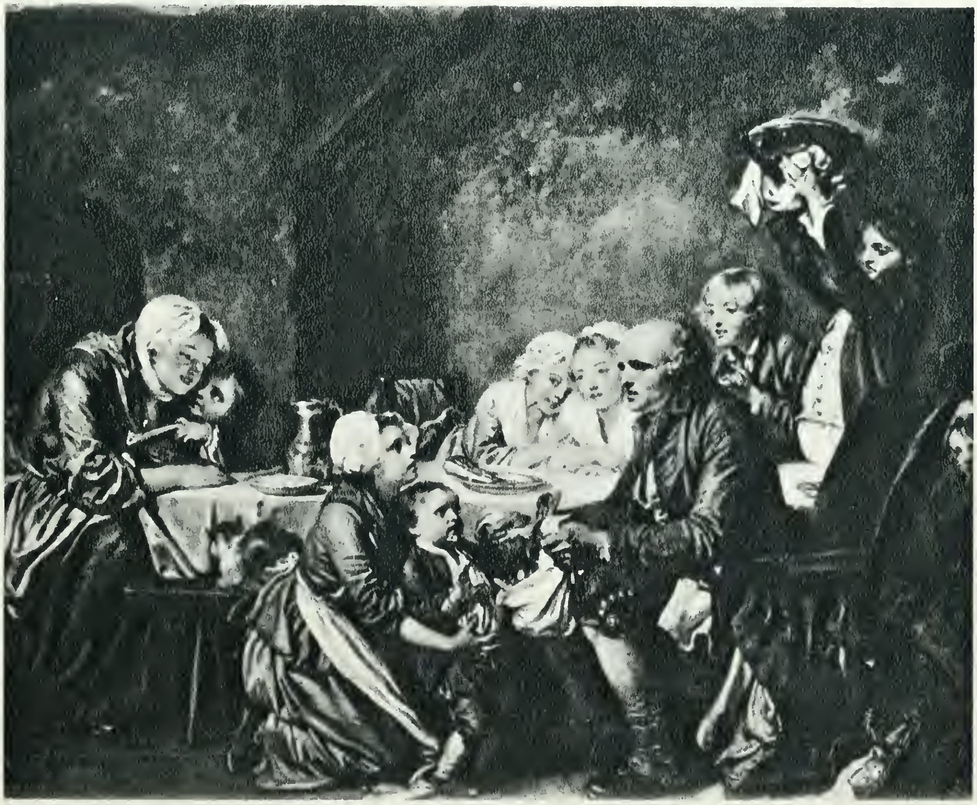
PEASANTS AT SUPPER, BY THE BROTHERS LE NAIN, IN THE LOUVRE



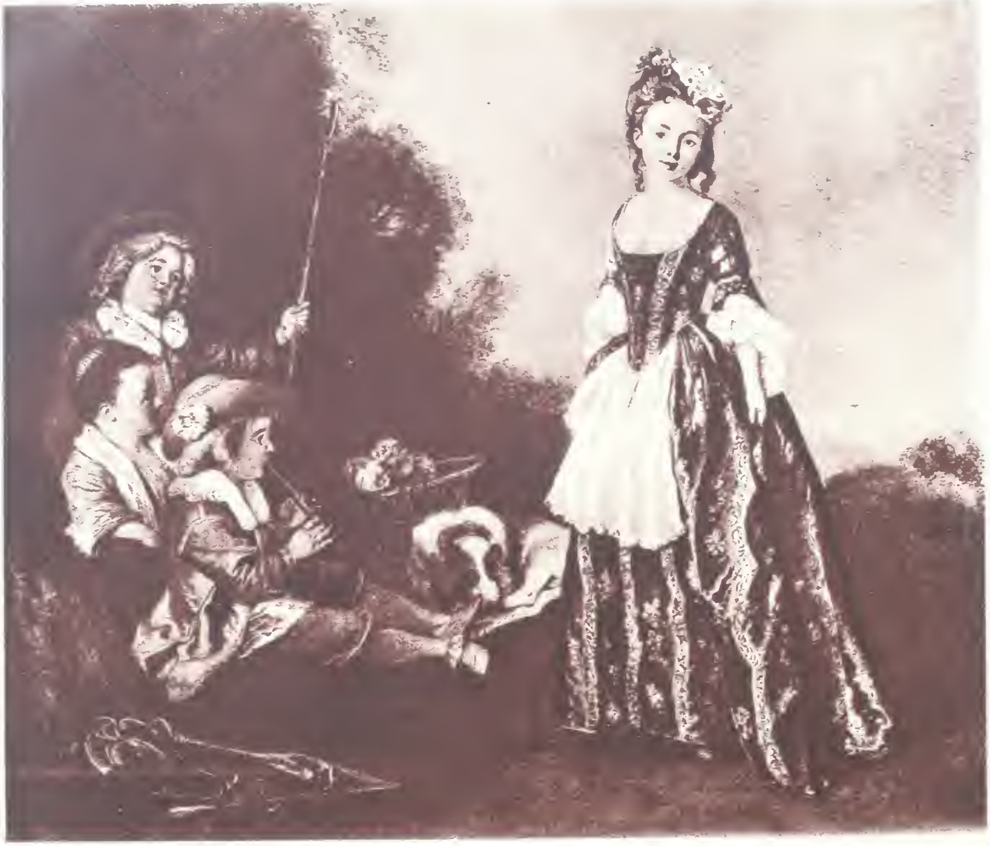
FIDELITY, BY GREUZE, IN THE WALLACE COLLECTION, LONDON



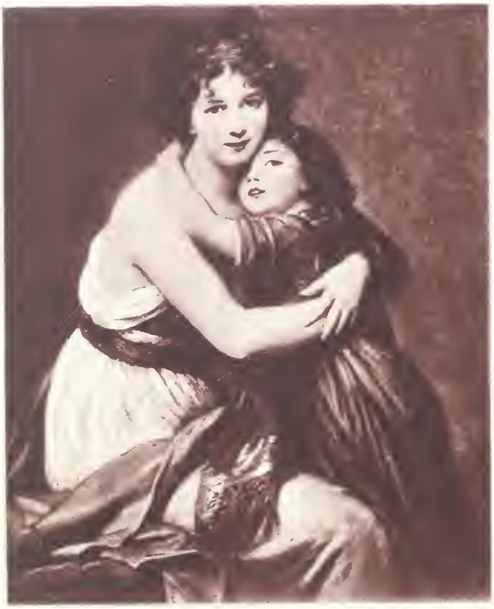
PORTRAIT OF A BOY AS A PIERROT, BY FRAGONARD



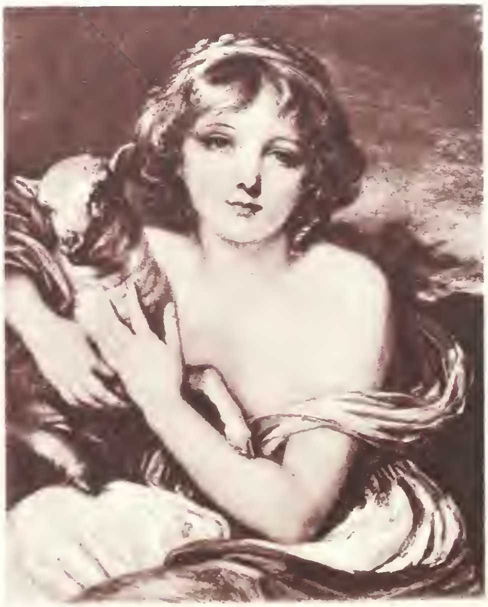
A SCENE OF FAMILY LIFE IN OLD FRANCE, BY GREUZE



PICTURE OF A GIRL DANCING, BY WATTEAU, IN THE ROYAL COLLECTION OF BERLIN



MADAME LE BRUN AND HER DAUGHTER, IN THE LOUVRE



INNOCENCE, BY GREUZE, IN THE WALLACE COLLECTION were unconsciously acquired during those decades of second-rate work. When the eighteenth century dawned, French painters could hold their own with Italians.

One artist, indeed, had flowered—and here that word is the fitting one to use—in Louis's old age. This was the incomparable Antoine Watteau. There is something very beautiful and fragrant in Watteau's work; it would seem as if the pictures ought to smell of lavender. All the grace, the solemn, proud, fantastic soul of France hides in those dainty figures that go pacing by under heavy trees and arching skies. These men and women who knew no hurry, who lived in a world where horses and coaches and sailing boats were quite swift enough means of travel, were caught and imprisoned in a remote, smiling perfection on the canvases of Watteau.

THE ELFIN TOUCH OF WATTEAU THAT WAS THE DESPAIR OF HIS RIVALS

This young artist, who was only thirty-seven when he died, in 1721, is the acknowledged head of the painters of "gallant" pictures of the early eighteenth century. These men turned France into a merry playground, in their mood of reaction after the stifling dominance of Louis XIV.

They painted endless pictures of picnics and countryside revelries, where ladies and gentlemen in shining silks and velvets made merry in the sunshine with dancing and singing and artless play. In Watteau's pictures there is always a slight aloofness and a dignity, which the men of his day vainly strove to imitate and failed, because the aloofness and the dignity were in the soul of Watteau, and the spirits of the others were made of commoner stuff.

Watteau was not only an exquisite painter: he was a marvelous draftsman. Pencil studies of faces in his sketch-books show how accurate was his knowledge, how much delicate and strong construction underlay his soft textures and flesh tints. For "Watteau has this note of a great artist, that as a foundation for his poetry, his dream, his idealism, he lays a constant and minute study of nature." His color is now silvery and shining, now warm like roses, now sombre gray. Across color and features, trees and costumes alike, falls that faint flicker of remoteness, as if an elfin brush had caught the picture in a spell.

Several of Watteau's paintings are in the Royal Collection in Berlin; among them The Dance, The Concert, the Fête Champêtre, Gersaint's Signboard. In the Louvre is his famous Embarkation for Cythera, and there also we can see pages of his sketch-book.

THE MERRY PICTURES OF THE GALLANT AGE IN FRANCE

The "gallant age" carried art very far from the style of the seventeenth century. The classical stream was still flowing; but the stream that bubbled with new life and gaiety and freedom was the one to which men were drawn at this time.

A great many artists painted pictures of gaily dressed people making merry—artists like Lancret and Pater, who frankly imitated Watteau. Boucher, whose output was enormous, painted many subjects, nearly all spoiled by a touch of vulgarity.

Some years later, in Fragonard, who lived from 1732 to 1806, the gallant age seems to have been caught in the form of one man. He was a happy, vivid kind of painter with a strength and purpose of his own. His graceful, jaunty, carefree figures in their charming settings may be seen at their best in the Wallace collection, London, in the Louvre, and in the Morgan collection, New York.

Before Fragonard's death taste in France had swung back to classical forms and subjects, and the artist of the gay and merry age was left poor and neglected.

THE MAN WHO PAINTED PEOPLE AS IF THEY WERE THINKING ALOUD

The eighteenth century carried on the work of portraiture so freely exercised in the reign of Louis XIV. Some very fine pictures were produced. The man whose paintings are the most memorable is Quentin de la Tour, who lived from 1704 to 1788. Shortly before his day a Venetian painter had introduced to the world of art the use of pastel—painting in crayon. This medium attracted La Tour's fancy, and he adopted it for most of his work. He has left a whole gallery of the men and women of his day—brilliant portraits, most of them, wherein a keen and fearlessly truthful picture of a person's character was recorded with light, vibrating strokes.

Like all portrait-painters, La Tour was interested in costume and setting, but when we look at his work we can see how intensely important to him were the feature of his sitters. He showed men and women thinking aloud, their lips hardly closed after a characteristic speech: "faces," says one writer, "touched in with colors like the dust on wings of butterflies." The principal collection of his works is in the museum of St. Quentin, his native town.

THE WAY CHARDIN LOVED TO PAINT THE HUMBLE PEOPLE OF FRANCE

In the meantime there was another and separate kind of painting developing in France, in the pictures of Siméon Chardin, who was born in 1699 and died in 1779. This artist was much influenced by the little Dutch masters, whose work was greatly admired in Paris. His pictures have the simplicity and honesty that belong to the Dutch genre paintings, with an added sweetness and refinement. In Chardin's work there is a seriousness that was new to the times. He painted pictures of home-loving people busy about their daily work, and these figures are refreshing to the eye and mind after the multitude of gay aristocrats who throng most of the canvases of that sumptuous age.

Chardin's "early love" in painting had been still-life subjects—fruit, dishes, game. Fine examples of this work of his are the pictures called The Silver Goblet, in the Louvre, and the Study of Still Life, in the National Gallery, London. Presently he began to paint interiors—a kitchen, a pantry or a sitting-room; and in them he placed people in the quiet, reposeful mood that was his secret. We feel we should like to have known the people and the homes that Chardin painted.

THE SERIOUSNESS IN FRENCH ART THAT CAME BEFORE THE REVOLUTION

The lovable picture Grace before Meat, shown on page 1875, The Housewife, The Industrious Mother, all in the Louvre, and La Fontaine, in the National Gallery, London, are excellent examples of the work of this man who knew nothing of classic lore or mythology and had no acquaintance with people of high estate. Not greatly appreciated in his own time, Chardin has grown into high favor now. In his handling of color he has probably not been surpassed by any other French painter.

Chardin's work has some kinship with that of the brothers Le Nain and of Fouquet, the artist of an earlier century—all men who, like the little Dutch masters, loved simple, honest things, forswearing the glitter of riches.

Another kind of seriousness developed in the sentimental generation that preceded the Revolution. About 1760 men found that they were weary of the frivolities of the gallant age, and they began to want pictures that should teach lessons of modesty and sober living. They also wanted landscapes because such subjects lead to meditation. A large number of painters reflected this public taste—among them Greuze, Madame Vigée le Brun, Joseph Vernet and Hubert Robert.

Jean Baptiste Greuze (1725–1805) introduced a new kind of genre, in story-telling pictures which gave a moral lesson. Such are The Father's Curse and The Wicked Son Punished. But he is better known as the painter of graceful young girls of a sweet innocence and amiable prettiness, often a little melancholy or wistful. If they were less sugary in their sweetness, less sentimental in expression and pose, they would make a more lasting appeal. Among the best are The Milkmaid and The Broken Pitcher, in the Louvre, and The Girl with Doves, in the Wallace collection, London.

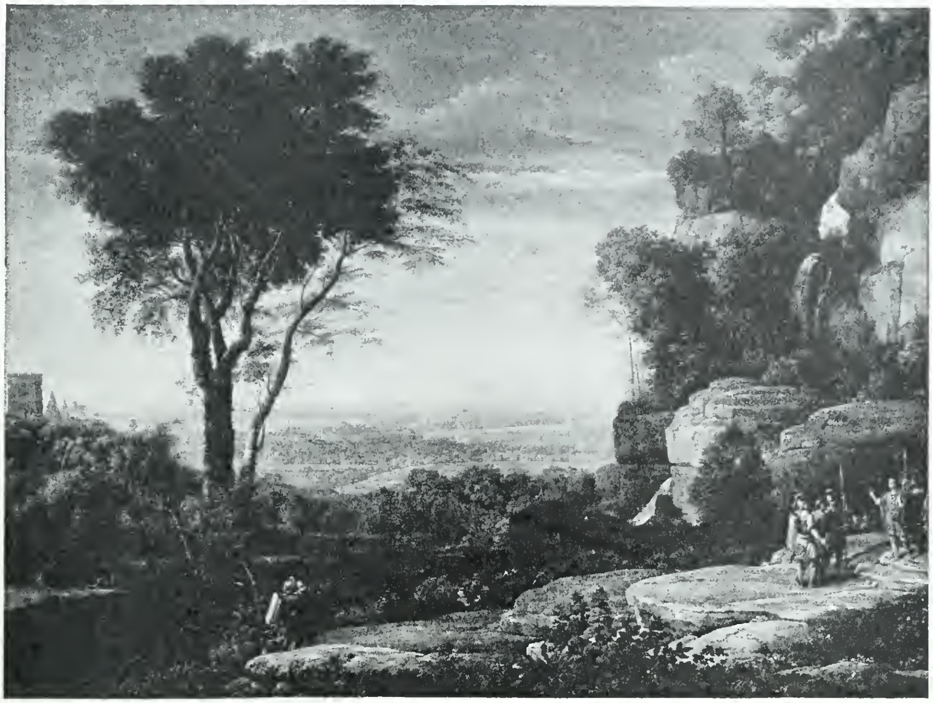
THE LAST PHASE OF THE ART OF A REMARKABLE CENTURY

Madame Vigée le Brun, in the course of her long life—1755 to 1842—painted a great many portraits, among them several of Queen Marie Antoinette. The painter, who was a favorite of the French nobility, had to live in other countries while France was suffering under the Revolution; everywhere she was welcomed and honored. But her last years, like her early ones, were spent in France.

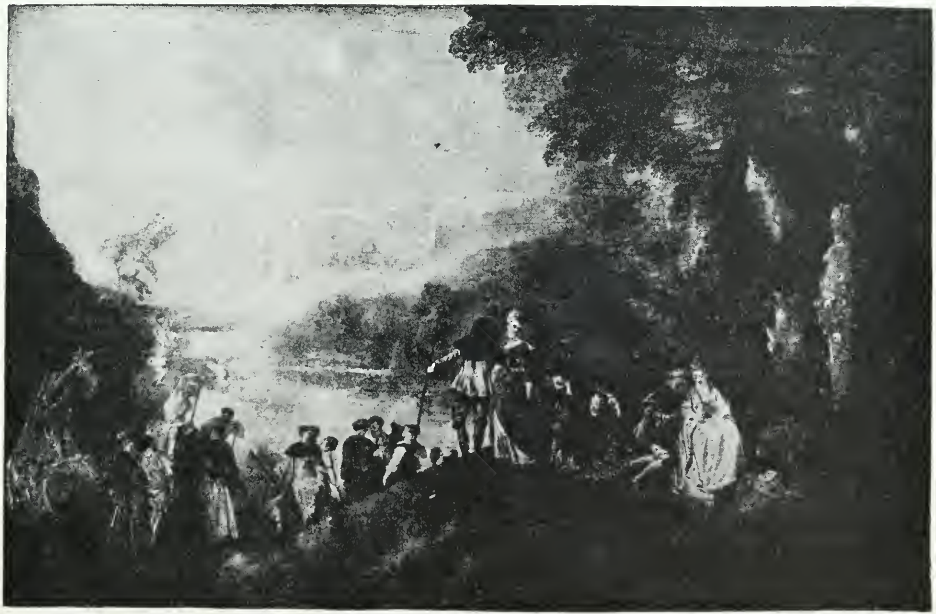
In her portraits Madame le Brun gives the sitters a sort of emotional charm and grace; they are all beautiful and affectionate. Her painting technique was excellent, her drawing careful, and her color warm and pleasing. Some of her best portraits can be seen in Paris and London. One, in the Louvre, is known and loved by all the world—the one portraying herself with her daughter (page 1880).

Joseph Vernet (whose son and grandson were also painters) and Hubert Robert were landscape-painters that delighted the public—Vernet with his storms and shipwrecks and evening skies, and Robert with his ruins of temples and gardens.

THE NEXT STORY OF THE FINE ARTS IS ON PAGE 1999.

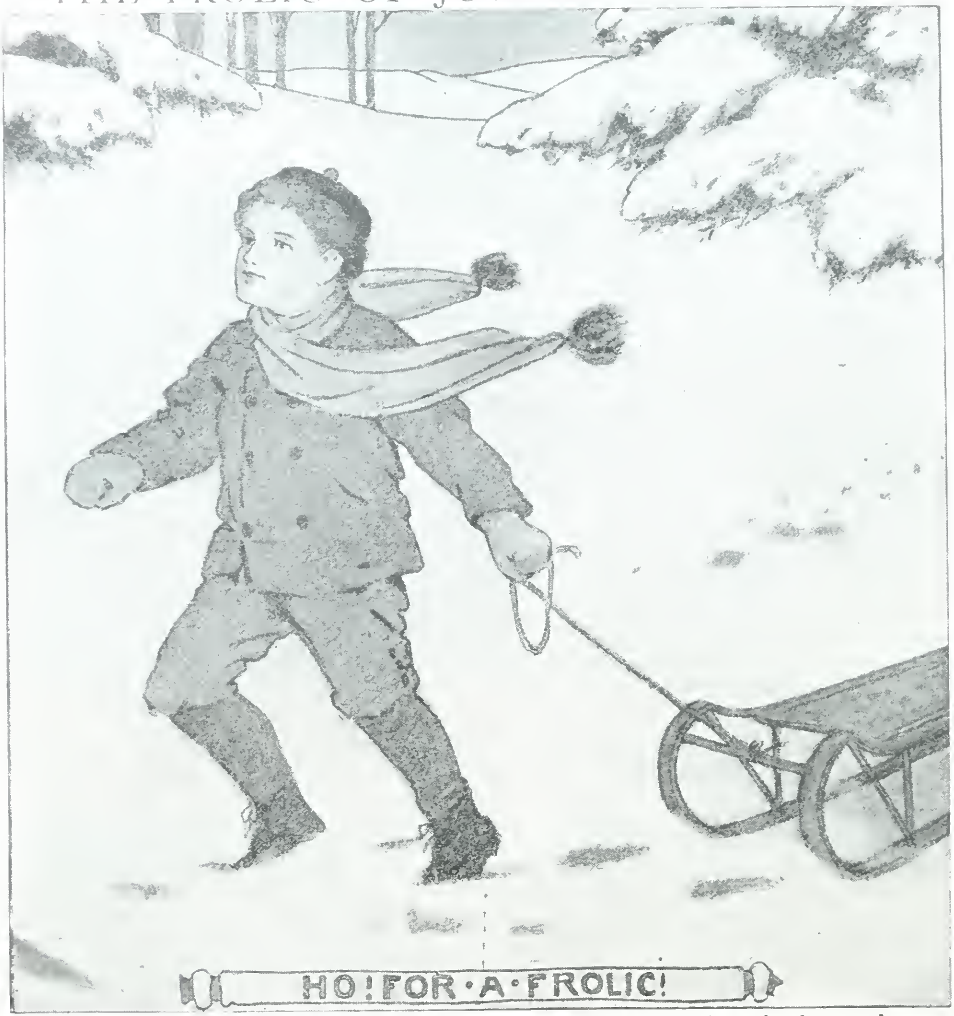


Photo, courtesy Metropolitan Museum of Art.
David at the Cave of Adullam, by Claude Lorrain, is an example of the French classic style, in which landscape and figures were idealized to heroic beauty or grandeur. In Claude's paintings the figures are of much less importance than the landscape itself. Though he studied nature and gave his light the appearance of real sunlight, his "nature" is too studied to be natural.



The Embarkation for Cythera, by Antoine Watteau, in the Louvre, is one of this artist's most characteristic pictures. The graceful figures move lightly through a lovely fanciful scene like the figures in a dream. While the life he pictured was artificial and the scenes were imaginary, the style in which he painted is in no way artificial and his landscape is built upon sound knowledge of natural forms.

THE FROLIC OF JOHNNY THE STOUT


HO! FOR A FROLIC!

"HO! for a frolic!"
Said Johnny the stout:
"There's coasting and sledding—
I'm going out!"

Scarcely had Johnny
Plunged in the snow,
When there came a complaint
Up from his toe.

"We're cold," said the toe,
"I and the rest;
There are ten of us freezing—
Standing abreast."

Then up spoke an ear:
"My! but it's labour—
Playing in winter. Eh,
Opposite neighbour?"

"Pooh!" said his nose,
Angry and red:
"Who wants to tingle?
Go home to bed!"

Eight little fingers,
Four to a thumb,
All cried together—
"Johnny, we're numb!"

But Johnny the stout
Wouldn't listen a minute;
Never a snow-bank
But Johnny was in it.

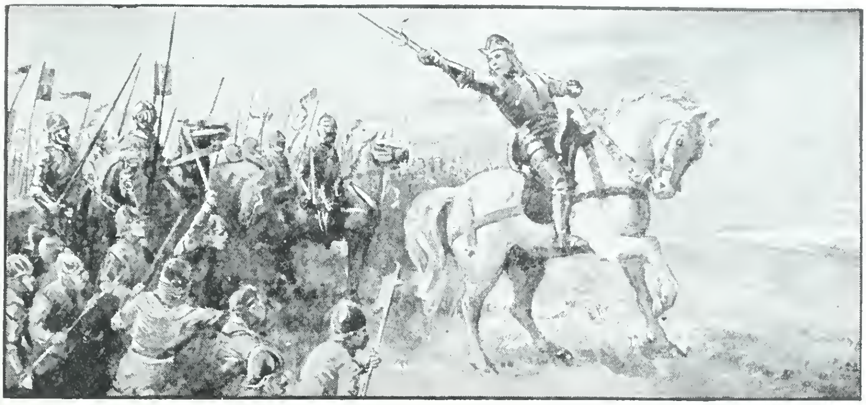
Tumbling and jumping,
Shouting with glee,
Wading the snow-drifts
Up to his knee.

Soon he forgot them,
Fingers and toes—
Never once heeded
The ear and the nose.

Ah, what a frolic!
All in a glow,
Johnny grew warmer
Out in the snow.

Often his breathing
Came with a joke:
"Blaze away, Johnny!
I'll do the smoke."

"And I'll do the fire,"
Said Johnny the bold;
"Fun is the fuel
For driving off cold."



THE BALLAD OF AGINCOURT

ON page 847 we read that charming fairy poem The Arming of Pigwiggen, by Michael Drayton, one of the famous Elizabethan poets. Here we have one of his spirited ballads, in which, with quick and graphic touch, he describes the battle of Agincourt, where the English army, led by King Henry V, won a great victory over the French after a closely contested battle, in which about ten thousand soldiers were killed. We read about the battle in the Book of All Countries on page 1684.

FAIR stood the wind for France,
When we our sails advance,
Nor now to prove our chance
Longer will tarry;
But putting to the main,
At Caux, the mouth of Seine,
With all his martial train,
Landed King Harry.

And taking many a fort,
Furnished in warlike sort,
Marched tow'rds Agincourt
In happy hour;
Skirmishing day by day
With those that stopped his way
Where the French gen'ral lay
With all his power.

Which, in his height of pride,
King Henry to deride,
His ransom to provide
To the king sending;
Which he neglects the while,
As from a nation vile,
Yet, with an angry smile,
Their fall portending.

And turning to his men,
Quoth our brave Henry then:
"Though they to one be ten,
Be not amazèd;
Yet have we well begun,
Battles so bravely won
Have ever to the sun
By fame been raisèd.

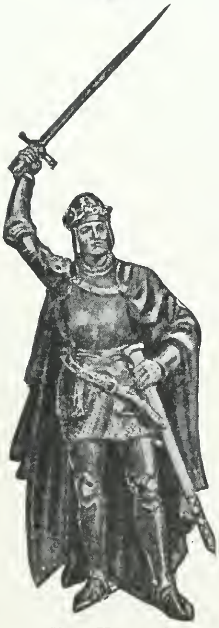
"And for myself," quoth he,
"This my full rest shall be:
England ne'er mourn for me,
Nor more esteem me:
Victor I will remain,
Or on this earth lie slain;
Never shall she sustain
Loss to redeem me.

"Poitiers and Cressy tell,
When most their pride did swell,
Under our swords they fell:
No less our skill is
Than when our grandsire great,
Claiming the regal seat,
By many a warlike feat
Lopped the French lilies."

The Duke of York so dread
The eager vaward led;
With the main Henry sped
Among his henchmen.
Excester had the rear,
A braver man not there:
O Lord, how hot they were
On the false Frenchmen!

They now to fight are gone;
Armour on armour shone;
Drum now to drum did groan,
To hear was wonder;
That with the cries they make
The very earth did shake;
Trumpet to trumpet spake,
Thunder to thunder.

Well it thine age became,
O noble Erpingham,
Which did the signal aim
To our hid forces!
When, from a meadow by,
Like a storm suddenly,
The English archery
Struck the French horses.



King Henry V.

With Spanish yew so strong,
Arrows a cloth-yard long,
That like to serpents stung,
Piercing the weather;
None from his fellow starts,
But playing manly parts,
And like true English hearts,
Stuck close together.

When down their bows they threw,
And forth their bilbows drew,
And on the French they flew,
Not one was tardy:
Arms were from shoulders sent;
Scalps to the teeth were rent;
Down the French peasants went;
Our men were hardy.

This while our noble king,
His broadsword brandishing,
Down the French host did ding,
As to o'erwhelm it;
And many a deep wound rent
His arms with blood besprent,
And many a cruel dent,
Bruisèd his helmet.

Glo'ster, that duke so good,
Next of the royal blood,
For famous England stood,
With his brave brother
Clarence, in steel so bright,
Though but a maiden knight,
Yet in that furious fight
Scarce such another.

Warwick in blood did wade;
Oxford the foe invade,
And cruel slaughter made,
Still as they ran up.
Suffolk his axe did ply;
Beaumont and Willoughby
Bare them right doughtily,
Ferrers and Fanhope.

Upon Saint Crispin's day
Fought was this noble fray,
Which fame did not delay
To England to carry.
O, when shall Englishmen
With such acts fill a pen,
Or England breed again
Such a King Harry?

ODE TO A NIGHTINGALE

In any selection of verse there should be one or two poems by John Keats, as he wrote at least six of the finest poems ever written. That given here contains a number of allusions to the mythology of ancient Greece, for Keats was steeped in ancient lore, and was really more inspired by the spirit of old Greece than by that of his own time.

My heart aches and a drowsy numbness pains
My sense, as though of hemlock I had drunk,
Or emptied some dull opiate to the drains
One minute past, and Lethe-wards had sunk:
'Tis not through envy of thy happy lot,
But being too happy in thy happiness—
That thou, light-wingèd Dryad of the trees,
In some melodious plot
Of beechen green, and shadow numberless,
Singest of summer in full-throated ease.
O for a draught of vintage, that hath been
Cooled a long age in the deep-delvèd earth,
Tasting of Flora and the country green,
Dance, and Provençal song, and sunburnt mirth!
O for a beaker full of the warm South,
Full of the true, the blushful Hippocrene,
With beaded bubbles winking at the brim
And purple-stainèd mouth;
That I might drink and leave the world unseen,
And with thee fade away into the forest dim:
Fade far away, dissolve, and quite forget
What thou among the leaves hast never known,
The weariness, the fever, and the fret
Here, where men sit and hear each other groan;
Where palsy shakes a few, sad, last grey hairs,
Where youth grows pale, and spectre-thin, and dies;
Where but to think is to be full of sorrow
And leaden-eyed despairs,
Where Beauty cannot keep her lustrous eyes
Or new Love pine at them beyond to-morrow.
Away! Away! for I will fly to thee,
Not charioted by Bacchus and his pards,
But on the viewless wings of Poesy,
Though the dull brain perplexes and retards.
Already with thee! tender is the night,
And haply the Queen-Moon is on her throne,
Clustered around by all her starry Fays;
But here there is no light,
Save what from heaven is with the breezes blown
Through verdurous glooms and winding mossy ways.
I cannot see what flowers are at my feet,
Nor what soft incense hangs upon the boughs,
But in embalmèd darkness, guess each sweet
Wherewith the seasonable month endows
The grass, the thicket, and the fruit-tree wild;
White hawthorn and the pastoral eglantine;
Fast fading violets covered up in leaves;
And mid-May's eldest child,
The coming musk-rose, full of dewy wine,
The murmurous haunt of flies on summer eves.
Darkling I listen; and, for many a time
I have been half in love with easeful Death,
Called him soft names in many a musèd rhyme,
To take into the air my quiet breath;
Now more than ever seems it rich to die,
To cease upon the midnight with no pain,
While thou art pouring forth thy soul abroad
In such an ecstasy!
Still wouldst thou sing, and I have ears in vain—
To thy high requiem become a sod.
Thou wast not born for death, immortal Bird!
No hungry generations tread thee down;
The voice I hear this passing night was heard
In ancient days by emperor and clown:
Perhaps the self-same song that found a path
Through the sad heart of Ruth, when, sick for home,
She stood in tears amid the alien corn;
The same that oft-times hath
Charmed magic casements, opening on the foam
Of perilous seas, in faery lands forlorn.
Forlorn! the very word is like a bell
To toll me back from thee to my sole self!
Adieu! the fancy cannot cheat so well
As she is famed to do, deceiving elf.
Adieu! adieu! thy plaintive anthem fades
Past the near meadows, over the still stream,
Up the hill-side; and now 'tis buried deep
In the next valley-glades:
Was it a vision, or a waking dream?
Fled is that music: Do I wake or sleep?

TRUE GREATNESS

The writer of this poem was Lady Elizabeth Carew, or Carey, who lived in the early years of the seventeenth century, and was the author of a tragedy entitled Marian, the Fair Queen of Jewry, which was performed in London in 1613. She was a relative, on her mother's side, of the great poet Edmund Spenser, and died in 1635. The word "seld" in the last verse is, of course, the same as "seldom."

THE fairest action of our human life
  Is scorning to revenge an injury:
For who forgives without a further strife
  His adversary's heart to him doth tie:
And 'tis a firmer conquest truly said
To win the heart, than overthrow the head.

If we a worthy enemy do find,
  To yield to worth, it must be nobly done:—
But if of baser metal be his mind,
  In base revenge there is no honour won.
Who would a worthy courage overthrow?
And who would wrestle with a worthless foe?

We say our hearts are great, and cannot yield;
  Because they cannot yield, it proves them poor;
Great hearts are task'd beyond their power but seld:
  The weakest lion will the loudest roar.
Truth's school for certain does this same allow,
High-heartedness doth sometimes teach to bow.

DOBBIN'S FRIEND*

In these pleasing rhymes the late Mary Mapes Dodge, some of whose poems we may have read, describes with the charm of simplicity and natural feeling the familiar picture of a kitten as stable companion to a horse.

DOBBIN has a little friend,
  Spotted white and sable;
Every day she goes to him,
  In his lonely stable.

Not a mite of dread has she,
  Not a thought of danger;
Lightly runs between his hoofs,
  Jumps upon his manger;

Lays her soft, warm cheek to his,
  Purrs her meek "Good-morning!"
Gives the flies that hover near,
  Such a look of warning!

"Dobbin, dear," she sometimes says,
  "Feel my winter mittens;
Nice and warm, you see, and made
  Purposely for kittens.

"Dobbin, dear, such times at home!
  Mother has caught a rat!
Brought it home to show to us—
  What do you think of that?"

"Dobbin!" she whispers, purring still,
  "You often get so weary,
Why don't you balk or run away,
  And get your freedom, dearie?"

Then Dobbin gives his head a toss,
  And says: "For shame, Miss Kitty,
If I could do so mean a thing,
  'Twould be a monstrous pity;

"No, no; my master's good and kind;
  I'll never vex him, never!"
And pussy, pleased, still rubs his cheek,
  And likes him more than ever.

THINGS THAT NEVER DIE

Miss Sarah Doudney, an English writer, is well known for her many stories for grown-ups as well as her books for girls.

THE pure, the bright, the beautiful,
  That stirred our hearts in youth,
The impulse to a wordless prayer,
  The dreams of love and truth;
The longings after something lost,
  The spirit's yearning cry,
The strivings after better hopes—
  These things can never die.

The timid hand stretched forth to aid
  A brother in his need,
The kindly word in grief's dark hour
  That proves a friend indeed;
The plea for mercy gently breathed
  When justice threatens high,
The sorrow of a contrite heart—
  These things shall never die.

The memory of a clasping hand,
  The pressure of a kiss,
And all the trifles, sweet and frail,
  That make up love's first bliss;
If with a firm unchanging faith,
  And holy trust on high,
Those hands have clasped, those lips have met—
  These things shall never die.

The cruel and the bitter word
  That wounded as it fell;
The chilling want of sympathy
  We feel but never tell;
The hard repulse that grieves the heart
  Whose hopes were bounding high
In an unfading record kept—
  These things shall never die.

Let nothing pass, for every hand
  Must find some work to do;
Lose not a chance to waken love—
  Be firm, and just and true:
So shall a light that cannot fade
  Beam on thee from on high,
And angel voices say to thee—
  "These things shall never die."

ONLY A BABY SMALL

The author of these familiar and pretty lines, the last four of which are very frequently quoted, was named Matthias Barr.

ONLY a baby small,
  Dropped from the skies;
Only a laughing face,
  Two sunny eyes.

Only two cherry lips,
  One chubby nose;
Only two little hands,
  Ten little toes.

Only a golden head,
  Curly and soft;
Only a tongue that wags
  Loudly and oft.

Only a little brain,
  Empty of thought;
Only a little heart,
  Troubled with naught.

Only a tender flower
  Sent us to rear;
Only a life to love
  While we are here.

Only a baby small,
  Never at rest;
Small, but how dear to us,
  God knoweth best.

---

*From Rhymes and Jingles, copyright, 1874, 1904, by Charles Scribner's Sons.

WHAT THE STARS HAVE SEEN

Oliver Wendell Holmes, an American physician, was born in Cambridge, Massachusetts, August 29, 1809, and died in Boston October 7, 1894. He achieved world-wide fame as a writer of both prose and verse illumined by humor and feeling. In these verses he pictures the stars above us as the everlasting silent watchers of this world of ours.

WHEN Eve had led her lord away,
And Cain had killed his brother,
The stars and flowers, the poets say,
Agreed with one another

To cheat the cunning tempter's art,
And teach the race its duty,
By keeping on its wicked heart
Their eyes of light and beauty.

A million sleepless lids, they say,
Will be at least a warning;
And so the flowers would watch by day,
The stars from eve to morning.

On hill and prairie, field and lawn,
Their dewy eyes upturning,
The flowers still watch from reddening dawn
Till Western skies are burning.

Alas! each hour of daylight tells
A tale of shame so crushing,
That some turn white as sea-bleached shells,
And some are always blushing.

But when the patient stars look down
On all their light discovers,
The traitor's smile, the murderer's frown,
The lips of lying lovers,

They try to shut their saddening eyes,
And in the vain endeavour
We see them twinkling in the skies,
And so they wink for ever.

THE DISCONTENTED APPLES

Frederic E. Weatherly is the author of this light and amusing little poem, which is not without a serious lesson that may be laid to heart by discontented young folk.

HE was an apple and she was an apple,
And they hung on an old brown tree;
And a fonder little couple
I trow you never would see.

But, alas! this little couple
They could not contented be;
"I should like to travel," she whispered,
"I wish that we could," said he.

But the summer went by so quickly,
And they still hung there on the tree:
For people can't always travel,
And apples are apples, you see.

And they sighed, and they groaned, and grumbled
At the home that they once loved well;
Till there came a great wind through the orchard,
And down on the ground they fell.

"Oh, dear, what a bump!" she whispered,
"I'm bruised all over," said he;
But if people at home won't tarry,
They must get a few bumps, you see.

Then they found themselves put in a basket.
"We're off to the world," said she;
"I wish we were back in the orchard,
If this is the world," said he.

And this poor little couple
Were put in a dark big pie;
"Oh, love," sighed the wife to her husband,
"I think we are going to die."

And the oven grew hotter and hotter,
And they died, with a dream of home;
"Why didn't we stay in the orchard?
Oh, why did we want to roam?"

WILLIE'S LODGER*

It is said that in each of us there are really two characters, a good and a bad one. In Willie's Lodger Mary Mapes Dodge gives us an excellent lesson: how to keep the worse of our two characters from gaining the upper hand.

TWO little boys named Willie
Live in the house with me.
One is as good a darling
As ever I wish to see;
His eyes are glad, his smile is sweet,
His voice is kind, his dress is neat,
And he is the boy for me.

This Willie says: "Good-morning!"
Happy as any bird;
A merrier laugh, a lighter step,
No mortal ever heard.
"Thank you," he says, and "If you please?"
He will not pout, he will not tease—
Oh, he is the boy for me!

The other Willie, sad to say,
Is very, very bad;
I think he is as cross a child
As ever a mother had.
"Go 'way!" he shrieks. He squalls and cries,
The angry tears oft fill his eyes—
He is not the boy for me.

He lingers round my Willie,
And whispers evil things—
Oh, how we dread him! for we know
The sin and grief he brings!
Who keeps him, then? Why, Willie's self;
He keeps this wicked Willie-elf
Who is not the boy for me.

If I were you, my Willie,
I'd make him stay away—
This boy who grieves your mother
And spoils your brightest day,
For he lives in you where he doesn't belong;
So oust him, Willie! Send him along!
"Clear out!" I'd say, "old Fume and Fret!
This heart of mine is not to let—
You're not the boy for me."

WHAT MIGHT HAVE BEEN

In these amusing verses by Frederic E. Weatherly we have the reverse of the state of mind described by the same writer in The Discontented Apples, on this page, and all will agree that the contentment of which he sings here is much better than the discontent of the apples.

THE little birds are singing
About their speckled eggs,
The daddy-long-legs talks about
His children's lovely legs;

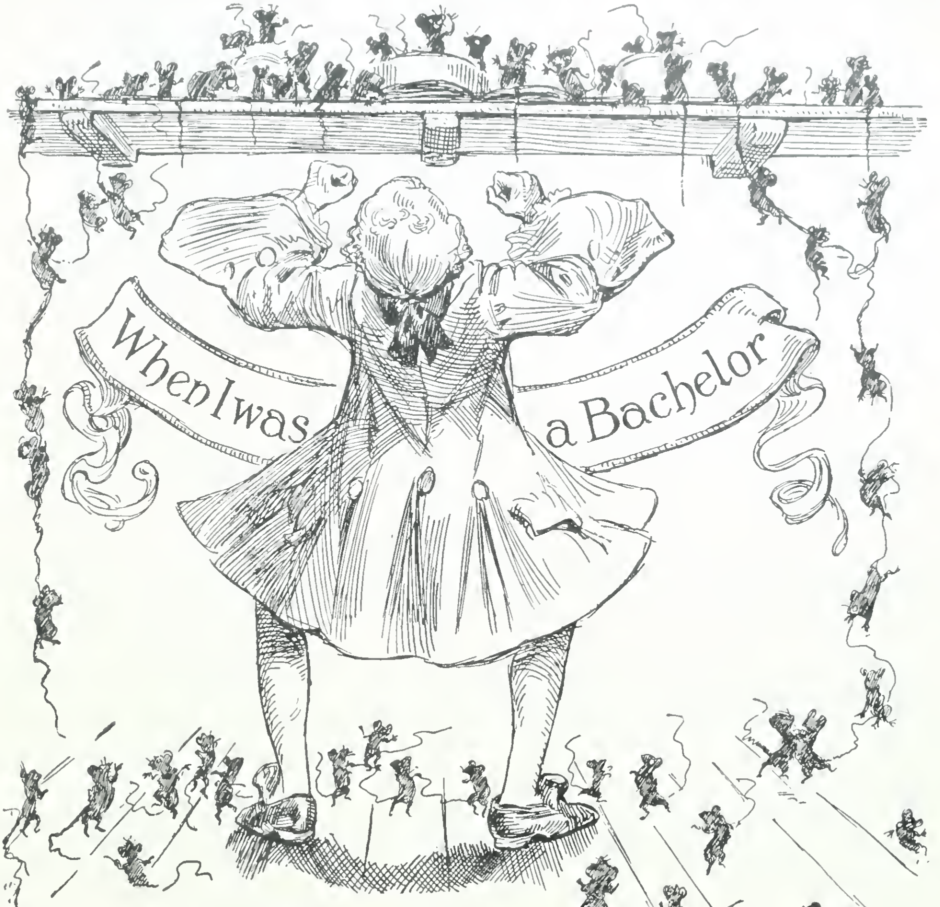
The red cow thinks her little calf
The best that there can be,
And my papa and my mamma
Are very proud of me!

And yet I might have been a bird
And slept within a nest,
Or been a daddy-long-legs,
With scarcely any chest;

Or been a little calf or pig,
And grown to beef or ham;
I'm very, very, very glad
That I am what I am!

---

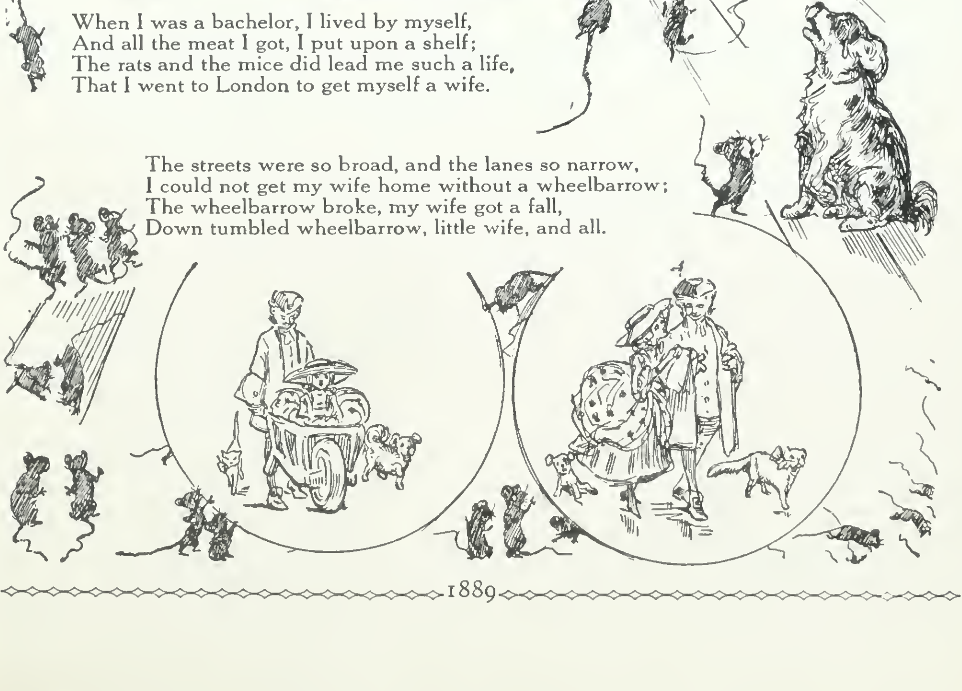
*From Rhymes and Jingles, copyright, 1874, 1904, by Charles Scribner's Sons. By permission of the publishers.



When I was a Bachelor

When I was a bachelor, I lived by myself,
And all the meat I got, I put upon a shelf;
The rats and the mice did lead me such a life,
That I went to London to get myself a wife.

The streets were so broad, and the lanes so narrow,
I could not get my wife home without a wheelbarrow;
The wheelbarrow broke, my wife got a fall,
Down tumbled wheelbarrow, little wife, and all.

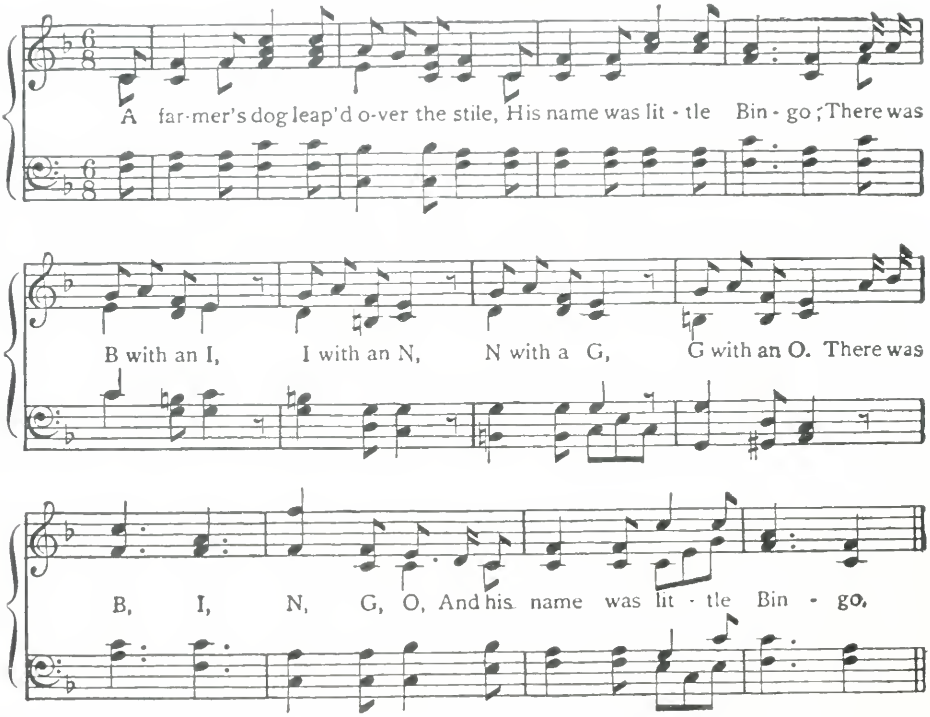


SOME little mice sat in a barn to spin;
Pussy came by, and she popped her head in.
"Shall I come in and cut off your threads?"
"Oh, no, kind sir; you will snap off our heads!"
"Oh, no, I'll not; I'll help you spin."
"That may be so; but you won't come in."

GOOD-MORROW to you, Valentine!
Curl your locks as I do mine;
Two before and three behind;
Good-morrow to you, Valentine!

I HAVE seen you, little mouse,
Running all about the house,
Through the hole, your little eye
In the wainscot, peeping sly,
Hoping soon some crumbs to steal,
To make quite a hearty meal.
Look before you venture out,
See if pussy is about;
If she's gone, you'll quickly run
To the larder for some fun,
Round about the dishes creep,
Taking into each a peep,
To choose the daintiest that's there,
Spoiling things, you do not care.

LITTLE BINGO



A far-mer's dog leap'd o-ver the stile, His name was lit - tle Bin - go; There was
B with an I, I with an N, N with a G, G with an O. There was
B, I, N, G, O, And his name was lit - tle Bin - go.

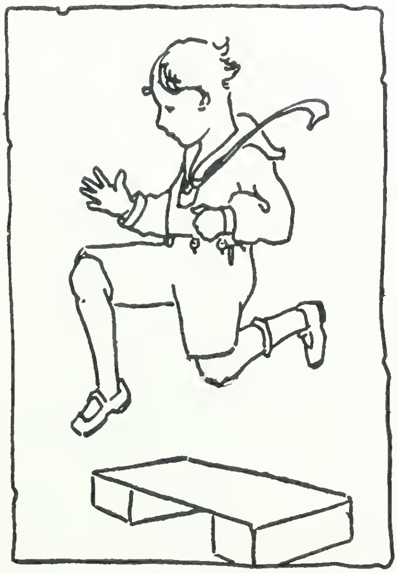
THE girl in the lane, that couldn't speak plain,
Cried gobble, gobble, gobble;
That man on the hill, that couldn't stand still,
Went hobble, hobble, hobble.

THERE was a little boy went into a field,
And lay down on some hay;
An owl came out and flew about,
And the little boy ran away.

LITTLE Betty Winkle she had a little pig,
It was a little pig, not very big;
When he was alive he lived in clover,
But now he's dead, and that's all over.
Johnny Winkle he
Sat down and cried;
Betty Winkle she
Lay down and died;
So there was an end of one, two, and three,
Johnny Winkle he,
Betty Winkle she,
And Piggie Wiggie!

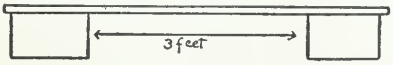
MORE WORTHWHILE GAMES

HURDLE GAMES—NEW WAYS TO SCORE THEM
NEW READING PUZZLES WITH ACTION WORDS



CAN you jump? Can you run and jump? Can you jump over a hurdle? The picture shows how some boys and girls made themselves a hurdle. You can make one too.

Find some blocks the same size. Empty cans will do just as well if you fill them with dirt or stones to make them steady. Then find a stick. Try to find one that is three feet long or even longer. Lay the blocks or cans down about three feet apart and lay the stick across them. The picture below is a hurdle, made in this easy way.

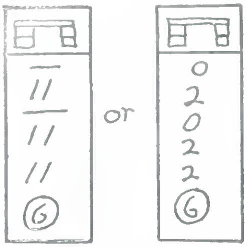


Hurdle

Go back a little way and run up to it and jump over it. Be careful not to knock off the stick. Did you jump it Just Right? If not, keep trying. Every time you jump the hurdle you score.

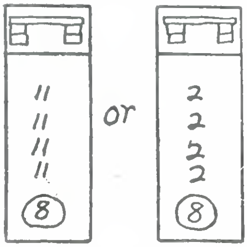
WHEN you jump it every time for three times or four times, or as many times as you think makes a good game, add a block or can on each side of the hurdle to make it higher. Begin a new game every time you make the hurdle higher.

Copyright, 1926, by Ethel B. Waring.

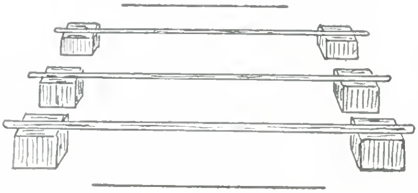


Every time you jump the hurdle now, you score how many? Yes, two, for it is twice as high as before and twice as hard to jump. Your score book will now look something like this.

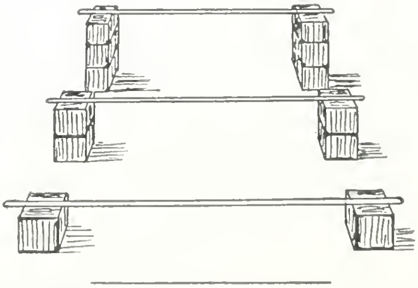
A Just Right score will look like this. Whenever you get a Just Right score, make your hurdle higher and start again. When your hurdle is three blocks high you will score three for each time you jump.



BELOW are some pictures that show other ways to use the hurdles. Instead of jumping the same hurdle three or four times, you can make a row of hurdles. Put them about three yards apart. A yard is three feet. Measure three feet for the first yard, another three feet for the second yard, and still another three feet to make three yards. Or you can make a yardstick. Make it three feet long. Then measure three yards by putting down your yardstick three times. The start, where you begin, may be three yards from the first hurdle so you get a good run to start with. The finish, where you stop, may be three yards past the last hurdle. Begin at the start and run to the finish, jumping each hurdle as you come to it. You score the number of hurdles you jump.



WHEN you can score Just Right on this game, you can make your hurdles higher. And you can change the running spaces between hurdles just as you think best. When you can jump the higher hurdles here is a good "stunt." You see from the picture that the first hurdle is low, the next higher and the last still higher.



How would you like a hurdle race? Race with someone who can

Note to mothers: To avoid disappointment, suggest low blocks or cans at the beginning.

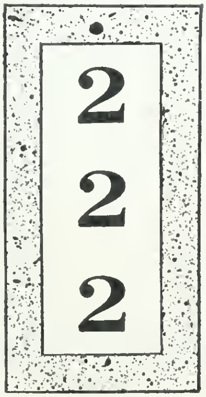
jump hurdles as high as you can. You decide together how high you will make your hurdles and whether you will have them all the same height. Make the distance between the hurdles longer than you have been making them, so you won't get in each other's way when racing. I think you won't if you make the start five or six yards away from the first hurdle, and your hurdles at least three yards apart, and even more if you can find the space.

Of course the first one to get to the finish wins, if he hasn't knocked off any of the sticks. If he has, but the other lad hasn't knocked off any, the other lad wins the race. If they both knock off sticks, you will have to make your own rules about scoring, but make them the fairest way you can, and then keep them for all the rest of the times.

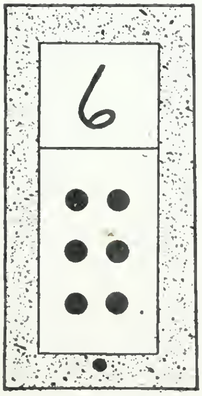
DOES it puzzle you to count your score when you score two each turn, or three, or four? You can count by twos just as easily as you can count by ones when you learn how. Here is a good game.

On pages 26 and 27 of your Work Book you will find some digits like those on your hurdle scores. Mount them as the picture shows you. It shows the printed digits. Mount the written ones the same way.

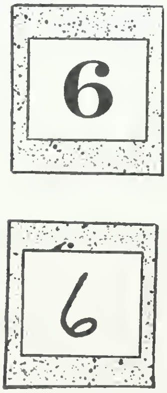
Front side



Back side



Answer card



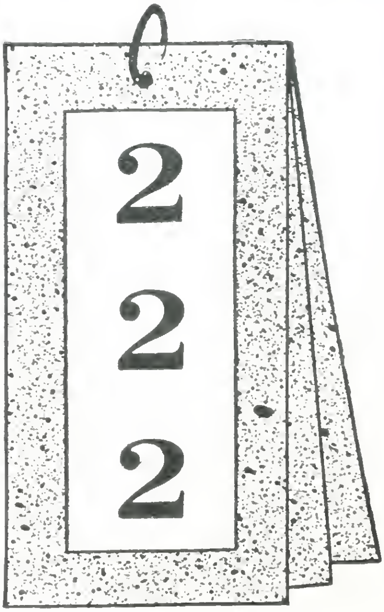
This picture shows the little answer cards, too. There are two of them for each digit. One side has the digit printed and the other side has the same digit written.

Here are some ways you can play with these cards. The leader spreads out all the little digit cards in the middle where everybody can see them. Then he fixes the pack of big cards right side up in his hand. He puts one down in front of each child so he can read the digits without touching the card. Each child counts up by twos or threes or fours as the card tells him, and takes up a digit card from the centre which says just as many as he has counted.

For this card 2 2 2 he would find a 6

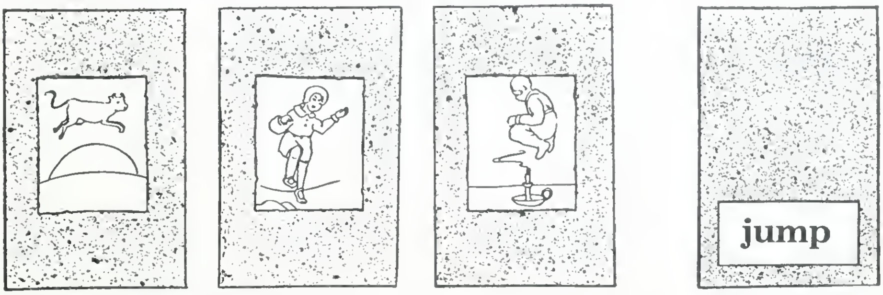
When the leader says the time is up, each child turns over his card to see if he is right. If so, he scores. Everybody puts back the digits into the centre, writes down his own score in his book, and then the leader gives him another card. When all the cards have been played, each one finds out his score, all decide who wins and who is the next leader of the game.

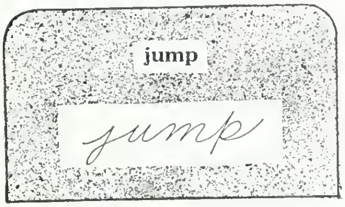
IF you play alone, give yourself three or four cards at a time. Match digits to them from the centre. Correct and score. Then give yourself another set of cards. Put a ring around your best score. Find out, if you can, how much you score altogether.



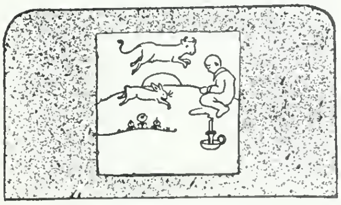
PUNCH a hole in the middle of one of your cards. Use this to mark on the others the place to punch. Stick a linen eyelet over each hole to make it strong. Then put the cards on a ring, as in the picture. See if you can count up and say the number about as fast as you can turn the cards on the ring. You can watch, as you turn over each card, to see if the digit you see on the back is the same as you said. Don't go so fast that you make mistakes. This game is a good game to play fast after you are sure you know how to do it Just Right.

LOOK at the pictures on page 28 of your Work Book. Do you see anything jump? Anything else jump? Yes, the cow can jump over the moon, the boy can jump over the hurdle, and Jack can jump over the candlestick. Take three cards two and a half inches one way and three and a half inches the other. Mount each one of these pictures on a card. On the other side of each, mount the word "jump." Mount it at the bottom of the card and draw a border around it, using the same kind and color of border for each of the "jump" words.





Now make the big word card for "jump." On page 32 of the Work Book are the words and the picture. You know the word says "jump" because everything in the picture can jump. Jump is an action word. So are run, fly, swim and climb.



As you get the time, make up the little game cards for action words. On pages 28, 29, 30 and 31 of your Work Book are the words and pictures for "run" and "sit," for "fly," "swim" and "climb," for "drink," "eat" and "hop." Use a different color for the border around "run" from the one you used for "jump." Find a different color for each new word you make cards for. Be sure that the same word always has the same-colored border. The pictures and words for the big word cards are on pages 31, 32, 33 and 34 of the Work Book.

When you have the action word cards and the small game cards made to match them, you can play all the games with them which you played with your color words and your animal words.

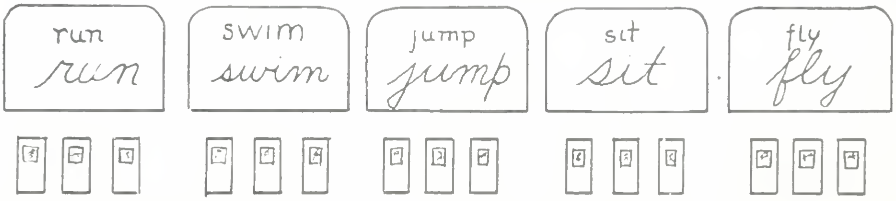
HERE are some ways that are a little different. The first one is easy. Give some of the cards to each child. See if everyone has the same number of cards. Perhaps one will have one more or one less than the others, for you can't always make it come out just the same for each.

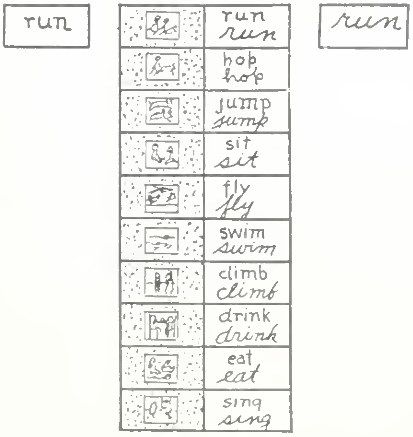
If you start the game, say something like this: "My cow can jump. John, what have you that can jump?" or this: "I have a cow. A cow can jump. John, have you anything that can jump?" If John has something that can jump, he puts it down. You be sure it is Just Right before you take it. See if the borders are the same in the back, for you remember you made them the same for all the words that said the same thing, and you made different colors for all that said something different. So if the borders match, John is right.

Try to get the three cards that belong together. They make a book, the "jump" book. Whenever you get a book, you put it down on the table near you until scoring time. The one who gets the most books wins the game.

Some children make another rule in this game. They say: "If a child gives you what you asked him for, you get another turn." This rule makes a pretty jolly game. Try it and see how you like it.

HERE is a harder game. Get out your word cards for jump, run, and so on. These are action words, because they tell different ways we act. Put down your action words in a row. Put the word side up. Under each put the pictures that belong with it. When you have finished, turn over the big cards and see if you are right.





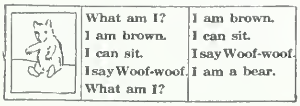
YOU remember this other way you practiced with color words. Try this game with your action words. On pages 35 and 36 of your Work Book are the words and pictures.

YOU have been scoring so well in your word games and reading games that I believe you can read animal puzzles. You know the animal words. You know the words that tell what color the animals are, and you know the words that tell what the animals do. The puzzle begins and ends with "What am I?" The answer ends with "I am a ———" whatever it is.

You will find on pages 37, 38 and 39 of your Work Book the puzzles and the answers. There are pictures, too, to help you. In the picture at the left, on this page, is the puzzle about the bear.

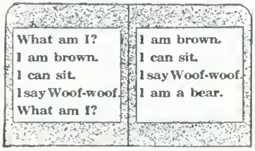
Cut some cards about nine inches one way and five or six inches the other. Find the middle of your card and draw a line. Mount the puzzle on the left side and the answer on the right side of the middle line. Turn the card over and mount the picture right in the middle.

In the Work Book



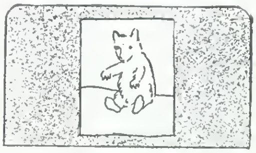
	What am I? I am brown. I can sit. I say Woof-woof. What am I?	I am brown. I can sit. I say Woof-woof. I am a bear.

Front of Card



What am I? I am brown. I can sit. I say Woof-woof. What am I?	I am brown. I can sit. I say Woof-woof. I am a bear.

Back of Card



Then cut your card in two on that middle line you drew. It is something like your "Who says" game, only you cut the cards in two the other way. You can play all the same games you played with the "Who says" cards. The reading is harder in these puzzles, but you know many more words now. I should like to see your score book, for it would tell me how well you are learning to read.

WHAT HAVE YOU LEARNED?

Do you know the animal words? The color words? The action words?

Which of the reading games can you score Just Right?

Can you play them fast as well as right? Which ones? All of them?

Can you read the puzzles and find the answers?

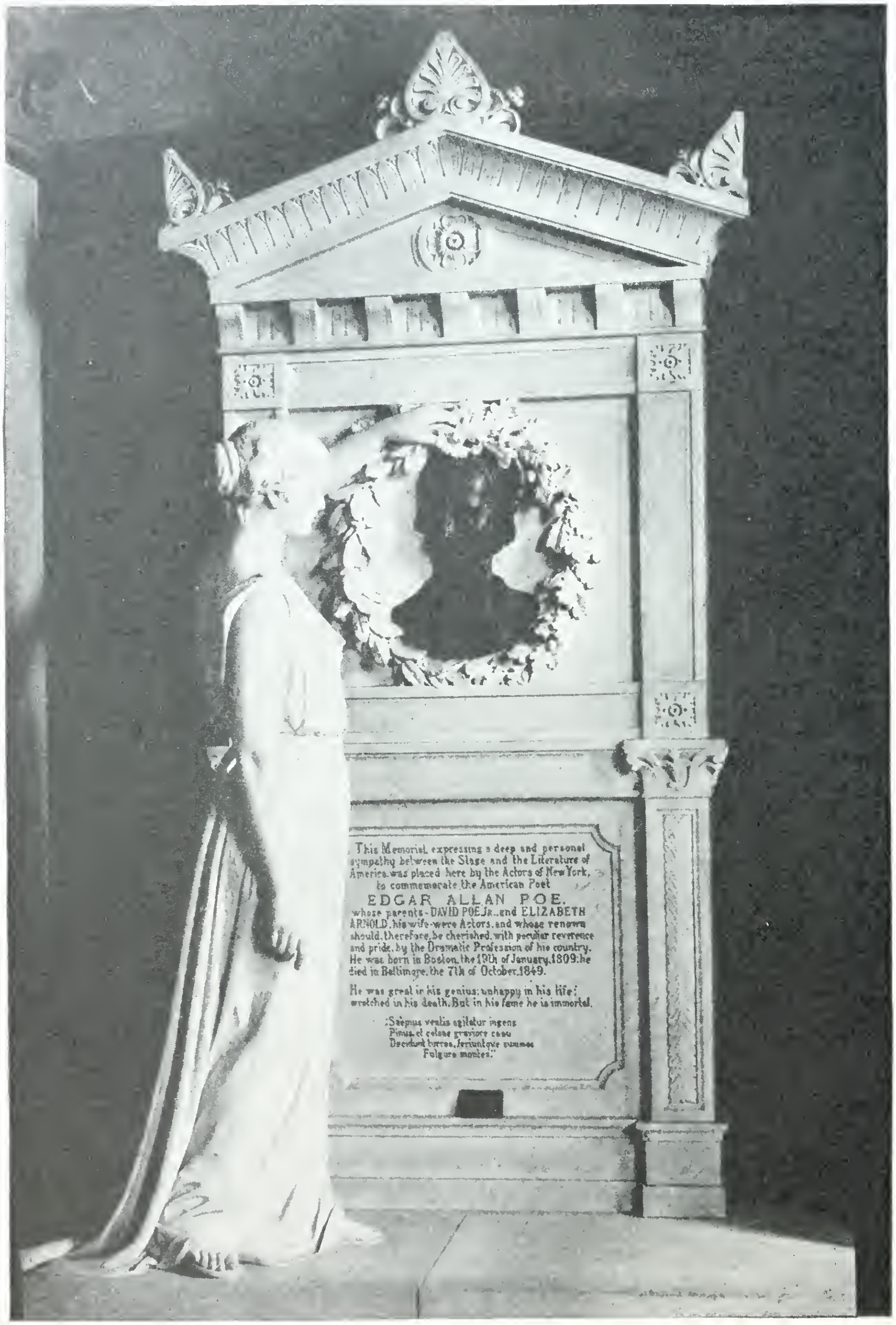
Can you jump hurdles?

Can you measure yards and feet?

Can you count by twos, threes, fours and fives?

THE NEXT HELPS TO LEARNING ARE ON PAGE 2049.

ONE OF THE IMMORTALS


This Memorial, expressing a deep and personal
sympathy between the Stage and the Literature of
America, was placed here by the Actors of New York,
to commemorate the American Poet
EDGAR ALLAN POE.
whose parents - DAVID POE Jr., and ELIZABETH
ARNOLD, his wife - were Actors, and whose renown
should, therefore, be cherished, with peculiar reverence
and pride, by the Dramatic Profession of his country.
He was born in Boston, the 19th of January, 1809; he
died in Baltimore, the 7th of October, 1849.
He was great in his genius; unhappy in his life;
wretched in his death. But in his fame he is immortal.
"Saepius ventis agitatur ingens
Pinus, et celsae graviore casu
Decidunt turres, feriuntque summos
Fulgura montes."

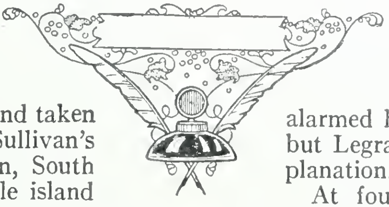
Photo, courtesy of the Metropolitan Museum of Art.

"The lofty pine is oftenest shaken by the wind; high towers fall with a heavier crash; and the thunderbolt strikes the highest mountains." Such is the translation of the Latin lines taken from Horace, which are part of the inscription of the memorial to Edgar Allan Poe. This memorial is in the Metropolitan Museum of Art, New York.

THE STORIES OF EDGAR ALLAN POE

EDGAR ALLAN POE was born in Boston in 1809 and died in Baltimore in 1849. His life was one of tragedy, and misfortune followed him all his days. Yet with that shadow over his life he produced some poems that will always live. And he became a master of mystery-story writing in a short form. Some of his tales are gruesome and full of horror, but they are perfectly told. As time goes on, people honor Poe's memory more and more, for no one in America has surpassed him in the art of story-telling. The Gold-Bug is a delightful treasure mystery story, in which the secret is revealed by a cipher, or code.

THE GOLD-BUG



WILLIAM LEGRAND, formerly wealthy but reduced to want, had left New Orleans and taken up his residence at Sullivan's Island, near Charleston, South Carolina. On this little island he had built a hut. An old negro called Jupiter attended to all his wants. Legrand's amusements were gunning, fishing and collecting shells and insects.

One chilly evening in October a friend called upon him and found him greatly excited. He had found a bug the color of gold and very strange and rare. Jupiter insisted that the insect was made of real gold. As he had lent the bug to another friend, Legrand pulled a piece of paper from his pocket and drew a picture of the little creature. The friend, who was holding the paper near the fire, declared he saw only a picture of a skull. Legrand was angry, but took back the paper, looked at it carefully, then put it quickly in his writing desk.

Some days later Jupiter told this friend that he was worried about his master, who all day long made figures on a slate. In answer to a note from Legrand the friend hurried over. He found Legrand waiting at the little wharf. In a boat close by were a scythe and three spades. The owner of the hut was acting strangely. Jupiter declared that his master's actions were caused by the gold-bug. Legrand said that was true. His statement alarmed his friend exceedingly, but Legrand would give no explanation.

At four o'clock that afternoon Legrand led the friend and Jupiter to a remote part of the island. He was carrying the gold-bug attached to a string, while the other two carried the tools. Beneath a large tulip tree a halt was called. Legrand gave the gold-bug to the old negro and told him to climb this very tall tree. Jupiter did not want to take the insect, of which he was afraid, but his master shamed him into obeying.

When the old man had climbed to the seventh branch Legrand told him to crawl out along the limb. There Jupiter found a skull, nailed down. Legrand became very much excited and instructed him to pass the bug through the left eye of the skull. From the spot where the bug touched the ground when let down by the string his master began to take measurements. At a certain point he told Jupiter to clear away the brambles with the scythe. Giving spades to his two companions, Legrand began digging. The three men worked hard until they had reached a depth of five feet. But they found nothing.

Legrand was bitterly disappointed

and was about to start for home when a thought struck him. Turning to Jupiter, he asked which was his left eye. The old negro immediately put his hand over his right eye.

"I thought so!—I knew it! Hurrah!" shouted Legrand. He went back to the tulip tree and altered the mark where the bug had touched the ground. From the new mark he measured once more. Again he gave the order to dig.

In a few seconds the spades had turned up a mass of human bones and a few coins. Excitement became intense. Ten minutes' work revealed an oblong chest of wood bound with iron. The men drew back the bolts. The rays of the lantern were reflected back by a heap of jewels!

All that night and next day the three men worked to carry the treasure to the hut. Everything in the chest was of gold. There was four hundred and fifty thousand dollars in gold coins, all very old. There were quantities of diamonds, rubies, emeralds and sapphires. There was a vast quantity of gold ornaments, including one hundred and ninety-three watches richly jeweled. All told, the value of the find was over a million and a half dollars.

The friend, who had been almost overcome with astonishment, demanded that Legrand tell how he had discovered the secret of the treasure. This the successful treasure-hunter was glad to do. He was proud of what he had accomplished.

The gold-bug was at the bottom of it all. Upon finding the bug Legrand had told Jupiter to pick it up. The negro had wrapped it in a scrap of paper he had found near by. It was on this paper that Legrand had sketched the insect. When his friend had seen a skull instead of a bug, Legrand's pride had been hurt, for he considered himself an artist. To his amazement he had discovered late that night that on the back of the paper was a drawing of a skull. Sure that this had not been on the paper, or rather parchment, when he had drawn the bug, he held the scrap close to the fire. The figure of an animal appeared. Legrand realized that someone had written on the parchment in invisible ink. The animal turned out to be a kid. At once Legrand thought of Captain Kidd and his buried treasure.

The rest of the explanation is given in Legrand's words taken directly from Poe's story.

THE SOLUTION OF THE CIPHER

"I HELD the vellum again to the fire, after increasing the heat, but nothing appeared. I now thought it possible that the coating of dirt might have something to do with failure: so I carefully rinsed the parchment by pouring warm water over it, and, having done this, I placed it in a tin pan, with the skull downward, and put the pan upon a furnace of lighted charcoal. In a few minutes, the pan having become thoroughly heated, I removed the slip, and, to my inexpressible joy, found it spotted, in several places, with what appeared to be figures arranged in lines. Again I placed it in the pan, and suffered it to remain another minute. Upon taking it off, the whole was just as you see it now."

Here Legrand, having re-heated the parchment, submitted it to my inspection. The following characters were rudely traced, in a red tint, between the death's-head and the goat:

"53‡‡†305))6*;4826)4‡);806*;48†8¶6
0))85;1‡(;:‡*8†83(88)5*†;46(;88*96*
?;8)*‡(;485);5*†2:*‡(;4956*2(5*—4)
8¶8*;4069285);)6†8)4‡‡;1(‡9;48081;
8:8‡1;48†85;4)485†528806*81(‡9;48;(
88;4(‡?34;48)4‡;161;:188;‡?;"

"But," said I, returning him the slip, "I am as much in the dark as ever. Were all the jewels of Golconda awaiting me upon my solution of this enigma, I am quite sure that I should be unable to earn them."

"And yet," said Legrand, "the solution is by no means so difficult as you might be led to imagine from the first hasty inspection of the characters. These characters, as any one might readily guess, form a cipher—that is to say, they convey a meaning; but then from what is known of Kidd, I could not suppose him capable of constructing any of the more abstruse cryptographs. I made up my mind, at once, that this was of a simple species—such, however, as would appear, to the crude intellect of the sailor, absolutely insoluble without the key."

"And you really solved it?"

"Readily; I have solved others of an abstruseness ten thousand times greater. Circumstances, and a certain bias of mind, have led me to take interest in such riddles, and it may well be doubted whether human ingenuity can construct an enigma of the kind which human ingenuity may not, by proper application, resolve. In fact, having once established connected and legible characters, I scarcely gave a thought to the mere difficulty of developing their import.

"In the present case—indeed in all cases of secret writing—the first question regards the *language* of the cipher; for the principles of solution, so far, especially, as the more simple ciphers are concerned, depend upon, and are varied by, the genius of the particular idiom. In general, there is no alternative but experiment (directed by probabilities) of every tongue known to him who attempts the solution, until the true one be attained. But, with the cipher now before us all difficulty was removed by the signature. The pun upon the word 'Kidd' is appreciable in no other language than the English. But for this consideration I should have begun my attempts with the Spanish and French, as the tongues in which a secret of this kind would most naturally have been written by a pirate of the Spanish Main. As it was, I assumed the cryptograph to be English.

"You observe there are no divisions between the words. Had there been divisions the task would have been comparatively easy. In such cases I should have commenced with a collation and analysis of the shorter words, and, had a word of a single letter occurred, as is most likely, (*a* or *I*, for example,) I should have considered the solution as assured. But, there being no division, my first step was to ascertain the predominant letters, as well as the least frequent. Counting all, I constructed a table thus:

Of the character	8	there are	33.
"	;	"	26.
"	4	"	19.
"	‡)	"	16.
"	*	"	13.
"	6	"	11.
"	†1	"	8.
"	0	"	6.
"	92	"	5.
"	:3	"	4.
Of the character	?	there are	3.
"	¶	"	2.
"	—	"	1.

"Now, in English, the letter which most frequently occurs is *e*. Afterward, the succession runs thus: *a o i d h n r s t u y c f g l m w b k p q x z*. *E* predominates so remarkably that an individual sentence of any length is rarely seen in which it is not the prevailing character.

"Here, then, we have, in the very beginning, the groundwork for something more than a mere guess. The general use which may be made of the table is obvious—but, in this particular cipher, we shall only very partially require its aid. As our predominant character is 8, we will commence by assuming it as the *e* of the natural alphabet. To verify the supposition, let us observe if the 8 be seen often in couples—for *e* is doubled with great frequency in English—in such words, for example, as 'meet,' 'fleet,' 'speed,' 'seen,' 'been,' 'agree,' etc. In the present instance we see it doubled no less than five times, although the cryptograph is brief.

"Let us assume 8, then, as *e*. Now, of all *words* in the language, 'the' is most usual; let us see, therefore, whether there are not repetitions of any three characters, in the same order of collocation, the last of them being 8. If we discover repetitions of such letters, so arranged, they will most probably represent the word 'the.' Upon inspection, we find no less than seven such arrangements, the characters being ;48. We may, therefore, assume that ; represents *t*, 4 represents *h*, and 8 represents *e*—the last being now well confirmed. Thus a great step has been taken.

"But, having established a single word, we are enabled to establish a vastly important point; that is to say, several commencements and terminations of other words. Let us refer, for example, to the last instance but one, in which the combination ;48 occurs—not far from the end of the cipher. We know that the ; immediately ensuing is the commencement of a word, and, of the six characters succeeding this 'the,' we are cognizant of no less than five. Let us set these characters down, thus, by the letters we know them to represent, leaving a space for the unknown—

t eeth.

"Here we are enabled, at once, to discard the *'th,'* as forming no portion of the word commencing with the first *t* ; since, by experiment of the entire alphabet for a letter adapted to the vacancy, we perceive that no word can be formed of which this *th* can be a part. We are thus narrowed into

t ee,

and, going through the alphabet, if necessary, as before, we arrive at the word 'tree,' as the sole possible reading. We thus gain another letter, *r*, represented by (, with the words 'the tree' in juxtaposition.

"Looking beyond these words, for a short distance, we again see the combination ;48, and employ it by way of *termination* to what immediately precedes. We have thus this arrangement:

the tree ;4(‡?34 the,

or, substituting the natural letters, where known, it reads thus:

the tree thr‡?3h the.

"Now, if, in place of the unknown characters, we leave blank spaces, or substitute dots, we read thus:

the tree thr...h the,

when the word *'through'* makes itself evident at once. But this discovery gives us three new letters, *o, u,* and *g,* represented by ‡, ?, and 3.

"Looking now, narrowly, through the cipher for combinations of known characters, we find, not very far from the beginning, this arrangement,

83(88, or egree,

which, plainly, is the conclusion of the word 'degree,' and gives us another letter, *d,* represented by †.

"Four letters beyond the word 'degree,' we perceive the combination

;46(;88.

"Translating the known characters, and representing the unknown by dots, as before, we read thus:

th.rtee,

an arrangement immediately suggestive of the word 'thirteen,' and again furnishing us with two new characters, *i* and *n,* represented by 6 and *.

"Referring, now, to the beginning of the cryptograph, we find the combination,

53‡‡†.

"Translating as before, we obtain

.good,

which assures us that the first letter is *A,* and that the first two words are 'A good.'

"It is now time that we arrange our key, as far as discovered, in a tabular form, to avoid confusion. It will stand thus:

5	represents	a
†	"	d
8	"	e
3	"	g
4	"	h
6	"	i
*	"	n
‡	"	o
(	"	r
;	"	t
?	"	n

"We have, therefore, no less than eleven of the most important letters represented, and it will be unnecessary to proceed with the details of the solution. I have said enough to convince you that ciphers of this nature are readily soluble, and to give you some insight into the *rationale* of their development. But be assured that the specimen before us appertains to the very simplest species of cryptograph. It now only remains to give you the full translation of the characters upon the parchment. Here it is:

"*'A good glass in the bishop's hostel in the devil's seat forty-one degrees and thirteen minutes northeast and by north main branch seventh limb east side shoot from the left eye of the death's-head a bee-line from the tree through the shot fifty feet out.'*"

"But," said I, "the enigma seems still in as bad a condition as ever. How is it possible to extort a meaning from all this jargon about 'devil's seats,' death's-heads, and 'bishop's hotels?'"

"I confess," replied Legrand, "that the matter still wears a serious aspect, when regarded with a casual glance. My first endeavor was to divide the sentence into the natural division intended by the cryptographist."

"You mean, to punctuate it?"

"Something of that kind."

"But how was it possible to effect this?"

"I reflected that it had been a *point* with the writer to run his words together without division, so as to increase the difficulty of solution. Now, a not over-acute man, in pursuing such an object, would be nearly certain to overdo the matter. When, in the course of his composition, he arrived at a break in his subject which would naturally require a pause, or a point, he would be exceedingly apt to run his characters, at this place, more than usually close together. If you will observe the MS., in the present instance, you will easily detect five such cases of unusual crowding. Acting upon this hint, I made the division thus:

"'*A good glass in the bishop's hostel in the devil's seat—forty-one degrees and thirteen minutes—northeast and by north—main branch seventh limb seat side—shoot from the left eye of the death's-head—a bee-line from the tree through the shot fifty feet out.*'"

"Even this division," said I, "leaves me still in the dark."

"It left me also in the dark," replied Legrand, "for a few days; during which I made diligent inquiry, in the neighborhood of Sullivan's Island, for any building which went by the name of the 'Bishop's Hotel'; for, of course, I dropped the obsolete word 'hostel.' Gaining no information on the subject, I was on the point of extending my sphere of search, and proceeding in a more systematic manner, when, one morning, it entered into my head, quite suddenly, that this 'Bishop's Hostel' might have some reference to an old family, of the name of Bessop, which, time out of mind, had held possession of an ancient manor-house, about four miles to the northward of the island. I accordingly went over to the plantation, and re-instituted my inquiries among the older negroes of the place. At length one of the most aged of the women said that she had heard of such a place as *Bessop's Castle,* and thought that she could guide me to it, but that it was not a castle, nor a tavern, but a high rock.

"I offered to pay her well for her trouble, and, after some demur, she consented to accompany me to the spot. We found it without much difficulty, when, dismissing her, I proceeded to examine the place. The 'castle' consisted of an irregular assemblage of cliffs and rocks—one of the latter being quite remarkable for its height as well as for its insulated and artificial appearance. I clambered to its apex, and felt much at a loss as to what should be next done.

"While I was busied in reflection, my eyes fell upon a narrow ledge in the eastern face of the rock, perhaps a yard below the summit upon which I stood. This ledge projected about eighteen inches, and was not more than a foot wide, while a niche in the cliff just above it gave it a rude resemblance to one of the hollow-backed chairs used by our ancestors. I made no doubt that here was the 'devil's-seat' alluded to in the MS., and now I seemed to grasp the full secret of the riddle.

"The 'good glass,' I knew, could have reference to nothing but a telescope; for the word 'glass' is rarely employed in any other sense by seamen. Now here, I at once saw, was a telescope to be used, and a definite point of view, *admitting no variation,* from which to use it. Nor did I hesitate to believe that the phrases, 'forty-one degrees and thirteen minutes,' and 'northeast and by north,' were intended as directions for the levelling of the glass. Greatly excited by these discoveries, I hurried home, procured a telescope, and returned to the rock.

"I let myself down to the ledge, and found that it was impossible to retain a seat upon it except in one particular position. This fact confirmed my preconceived idea. I proceeded to use the glass. Of course, the 'forty-one degrees and thirteen minutes' could allude to nothing but elevation above the visible horizon, since the horizontal direction was clearly indicated by the words, 'northeast by north.' This latter direction I at once established by means of a pocket-compass; then, pointing the glass as nearly at an angle of forty-one degrees of elevation as I could do it by guess, I moved it cautiously up or down, until my attention was arrested by a circular rift or opening in the foliage of a large tree that overtopped its fellows in the distance. In the centre of this rift I perceived a white spot, but could not, at first, distinguish what it was. Adjusting the focus of the telescope, I again looked, and now made it out to be a human skull.

"Upon this discovery I was so sanguine as to consider the enigma solved; for the phrase 'main branch, seventh limb, east side,' could refer only to the position of the skull upon the tree, while 'shoot from the left eye of the death's-head' admitted, also, of but one interpretation, in regard to a search for buried treasure. I perceived that the design was to drop a bullet from the left eye of the skull, and that a bee-line, or, in other words, a straight line, drawn from the nearest point of the trunk through 'the shot' (or the spot where the bullet fell), and thence extended to a distance of fifty feet, would indicate a definite point—and beneath this point I thought it at least *possible* that a deposit of value lay concealed."

"All this," I said, "is exceedingly clear, and, although ingenious, still simple and explicit. When you left the Bishop's Hotel, what then?"

"Why, having carefully taken the bearings of the tree, I turned homeward. The instant that I left 'the devil's-seat,' however, the circular rift vanished; nor could I get a glimpse of it afterward, turn as I would. What seems to me the chief ingenuity in this whole business, is the fact (for repeated experiment has convinced me it *is* a fact) that the circular opening in question is visible from no other attainable point of view than that afforded by the narrow ledge upon the face of the rock.

"In this expedition to the 'Bishop's Hotel' I had been attended by Jupiter, who had, no doubt, observed, for some weeks past, the abstraction of my demeanor, and took especial care not to leave me alone. But, on the next day, getting up very early, I contrived to give him the slip, and went into the hills in search of the tree. After much toil I found it. When I came home at night my valet proposed to give me a flogging. With the rest of the adventure I believe you are as well acquainted as myself."

"I suppose," said I, "you missed the spot, in the first attempt at digging, through Jupiter's stupidity in letting the bug fall through the right instead of through the left eye of the skull."

"Precisely. This mistake made a difference of about two inches and a half in the 'shot'—that is to say, in the position of the peg nearest the tree; and had the treasure been *beneath* the 'shot,' the error would have been of little moment; but 'the shot,' together with the nearest point of the tree, were merely two points for the establishment of a line of direction; of course the error, however trivial in the beginning, increased as we proceeded with the line, and by the time we had gone fifty feet threw us quite off the scent. But for my deep-seated impressions that treasure was here somewhere actually buried, we might have had all our labor in vain."

"But your grandiloquence, and your conduct in swinging the beetle—how excessively odd! I was sure you were mad. And why did you insist upon letting fall the bug, instead of a bullet, from the skull?"

"Why, to be frank, I felt somewhat annoyed by your evident suspicions touching my sanity, and so resolved to punish you quietly, in my own way, by a little bit of sober mystification. For this reason I swung the beetle, and for this reason I let it fall from the tree. An observation of yours about its great weight suggested the latter idea."

"Yes, I perceive; and now there is only one point which puzzles me. What are we to make of the skeleton found in the hole?"

"That is a question I am no more able to answer than yourself. There seems, however, only one plausible way of accounting for them—and yet it is dreadful to believe in such atrocity as my suggestion would imply. It is clear that Kidd—if Kidd indeed secreted this treasure, which I doubt not—it is clear that he must have had assistance in the labor. But this labor concluded, he may have thought it expedient to remove all participants in his secret. Perhaps a couple of blows with a mattock were sufficient, while his coadjutors were busy in the pit; perhaps it required a dozen—who shall tell?"

. . . .

So ends the curious tale as Edgar Allan Poe tells it. But the end is so sharp and sudden that it leaves us gasping and eager to know more. What of the gold-bug itself? From the moment Jupiter dropped it through the eye of the skull we hear no more of it. Did Legrand abandon the strange insect that restored him to fortune? Or did the scarabæus unfold its golden wings and vanish into the waiting night? Evidently Poe thought it well to leave the end of the uncanny creature to our imaginations.

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